BLM Comment Summary

Following open houses in Rangely, Meeker, Rifle, and Grand Junction, the Shell Frontier Oil and Gas Inc. (Shell) Environmental Assessment (EA) was prepared and the official public comment period opened upon publication of the document on August 15, 2006. The EA was available for public comment through September 18, 2006.

The Bureau of Land Management (BLM) distributed a notification and inquiry via first-class mail to contacts on the mailing list, announcing the availability of the EA in various media formats. The mailing list includes federal, state, and local elected officials, and interested members of the public. Availability of the EA was also announced by publishing notices in local newspapers.

The EA was mailed out to approximately 65 individuals, groups, and agencies. It was provided for public review by bound paper or CD-ROM format upon request, and posted for review or downloading on the project web site.

A total of 37 submissions were received from the public by letter, fax, and email on the EA for the Shell Oil Shale Research, Development, and Demonstration (RD&D) Project. Most submissions (e.g., letters) contained more than one comment, resulting in a total of 217 comments received.

Table 1 summarizes the submissions by identifying the type of commenter (e.g., organization, agency, individual), names of commenters (listed below the type of commenter), and the number of submissions received (a submission is one piece of correspondence, such as a letter, which can include multiple comments). Each commenter was also assigned a commenter ID, as shown in Table 1. Using this ID, commenters can find responses to their specific comments in Table 3.

Table 1: Summary of Comment Submissions

Commenter	Commenter ID	Number of Submissions
Organization Submissions • Club 20 • Western Resource Advocates (WRA) (representing Colorado Environmental Coalition, Colorado Mountain Club, Center for Native Ecosystems, Californians for Western Wilderness, Environment Colorado, High Country Citizens' Alliance, National Wildlife Federation, Natural Resources Defense Council, Western Colorado Congress, Western Organization of Resource Councils, Western Resource Advocates, Wilderness Workshop, and the Wilderness Society)	 OG01 OG02	2
Federal Agency Submissions • U.S. Department of Agriculture, United States Forest Service, White River National Forest (WRNF) • U.S. Department of the Interior, Fish and Wildlife Service (USFWS) • U.S. Department of Interior, U.S. Geological Survey (USGS)	 FD01 FD02 FD03	3

Commenter	Commenter ID	Number of Submissions
State Agency and County Submissions		5
• Rio Blanco County, Board of County Commissioners	ST01	
• Colorado Department of Public Health and Environment (CDPHE)	ST02	
• Colorado Division of Water Resources (CDWR)	ST03	
• Department of Natural Resources, Colorado Division of Wildlife (CDOW)	ST04	
• Colorado River Board of California (CRB)	ST05	
Corporations/Private Company Submissions		1
• Shell Frontier Oil and Gas Inc.	CO01	
Individual Submissions		26
• Adamowski, Gil	IN01	
• Baker, Ed	IN02	
• Blanco, Wilfredo	IN03	
• Byrd, Taysha	IN04	
• Distel, Keith	IN05	
• Fisher, Nora	IN06	
• Fryer, Brent C.	IN07	
• Goe, Mike	IN08	
• Haggerty, Allen	IN09	
• Himes, Brad	IN10	
• Jewkins, Joshua	IN11	
• Kent, Larry D.	IN12	
• Kieding, Brad	IN13	
• Miller, Alicia	IN14	
• Miller, Dave	IN15	
• Miller, Glen A.	IN16	
• Miyazono, Darcie	IN17	
• Muelot, Craig N.	IN18	
• Nichols, Nate	IN19	
• Oleksiuk, Terry M.	IN20	
• Stamper, Vicki and Williams, Megan	IN21	
• Strouse, Judith	IN22	
• Taylor, Sheri	IN23	
• Taylor, Trevor	IN24	
• Taylor, Vinny	IN25	
• West, James	IN26	
Total Submissions		**37**

Each individual comment was then assigned a comment number (shown in Table 3), which is comprised of the commenter ID followed by a sequential number. For example, assume Jane Doe submitted one letter that included four comments, and that Jane's Comment ID is IN14. Each of her four comments are assigned the following comment numbers: IN14-01, IN14-02, IN14-03, and IN14-04.

Each comment is categorized by overall theme or issue, listed below.

Table 2: Comment Categories and Themes

Comment Category	Theme
AQ	air quality (includes visibility)
CML	cumulative impacts
DAT	data collection
DET	level of detail
ENGY	energy
GEN	general
LES	leases
NEPA	National Environmental Policy Act
NOIS	noise
PERM	permits
RMP	Resource Management Plan
SOC	Socioeconomics (may include roads)
SPIL	spill prevention
TECH	technology
TE	threatened and endangered species
UTIL	utilities
VEG	vegetation and wetlands
WILD-A	wildlife (aquatic)
WILD-T	wildlife (terrestrial)
WQ	water quality/quantity

Table 3 lists the comment category and theme (as defined above) for each of the comments received, along with a comment number and a summary of that comment. A response to each comment follows the summary.

Comments that were very similar were grouped and given a single response. In those situations, more than one comment number is provided. For example, assume that Jane Doe's comment number IN14-04 and a state agency's comment number ST09-22 are both about water rights. The Comment Number column would include IN14-04 and ST09-22 beside the summarized comment about water rights.

GENERAL COMMENT RESPONSES COMMON TO ALL OF THE OIL SHALE RD&D EAs

During the BLM's analysis of comments, the following general areas of concern, or comment themes, were identified.

- Air Quality
- Water
- Social and Economic Impacts
- Lease Terms
- Permits from state or local governments
- Environmental Impact Statement (EIS) vs. EA
- Narrow statement of Purpose and Need

- Reasonable Range of Alternatives
- Preference Right Acreage
- Comments that are outside the scope of the RD&D EAs

General responses to these themes are below. Detailed response to comments can be found in the tables that follow the general responses.

Air Quality Impacts

Air quality modeling was completed for the Oil Shale RD&D projects to provide the BLM with adequate information relevant to issues raised during the initial scoping for the RD&D projects and to compile additional information on which to make an informed decision. The modeling chosen for the five RD&D projects (AERMOD) is appropriate for the scale and scope of the RD&D projects and has been extensively used in past assessments. Because of the nature of the research and development, some uncertainties were expected and the BLM consistently chose to use conservative estimates, those that maximize potential air quality impacts, when uncertainties arose.

In addition, mitigating measures identified in the subalternative were not completely accounted for in the air modeling. The result was an analysis that showed a potential for cumulative visibility impacts. Because of the conservative, or worst-case scenario, approach taken in modeling, the BLM believes there will not be any actual impacts to visibility as a result of adding oil shale RD&D projects to existing activities. In addition, extensive monitoring, pollution prevention, and permitting requirements further alleviate the possibility of any significant air quality impacts associated with the RD&D projects.

Water Impacts

Many comments addressed uncertainties in water impacts associated with the RD&D projects. BLM acknowledged that there are uncertainties associated with water quality and has undertaken extensive mitigation efforts to address those issues. The key to minimizing impacts so they remain insignificant is to implement the identified mitigation and to require a comprehensive water (groundwater and surface water) monitoring and response plan. The BLM is committed to incorporating not only the comments, but also the appropriate local, state, and federal agencies, to the maximum extent possible, in developing comprehensive monitoring and response plans. The coordination and collaboration on these plans would extend beyond the agencies and would include all three companies in order to provide meaningful data across all five projects that could accurately reflect the baseline, operational, and post-operational conditions that accompany in-situ oil shale development. Involvement of technical experts among the agencies is the only way to incorporate the critical parameters into the monitoring plans, to develop data reporting requirements, and to determine how data would be interpreted. To this end, the BLM has begun coordination by holding monthly meetings in its Colorado State Office with federal, state, and local agencies on progress in the RD&D effort. These meetings will be critical in identifying permit requirements in the near term and continue to determine the monitoring needs described above.

As with air quality, extensive monitoring, pollution prevention, and permitting requirements further alleviate the possibility of any significant water quality impacts associated with the RD&D projects.

Social and Economic Impacts

While the oil shale RD&D projects will progress on a staggered schedule and are of relatively small scale, they have the potential to further strain the social and economic structure in the local area over the next 10 years. It has been noted by local officials that oil shale companies that are already engaged in energy development in northwestern Colorado, specifically Chevron and Shell, have maintained a positive relationship with local governments. Concerns voiced over social and economic impacts include concerns over employee housing, road maintenance and improvement, law enforcement, and emergency response. Some suggestions brought forward to mitigate these concerns are not within the authority of the BLM to guarantee or to include in a lease as a condition of approval. The BLM will continue to facilitate to the maximum extent possible, collaboration and communication between local governments and the companies operating within their jurisdictions.

The greatest potential for strain on the local housing markets and roads is likely to occur from the Shell RD&D project which anticipates the largest influx of temporary workers. In comments submitted to the BLM, Shell is planning to develop temporary quarters to accommodate a large majority of the workers that they anticipate needing during the construction and operation stages of their RD&D projects.

Lease Terms

Standard Lease Terms have been developed to provide the lessee the right to use the leased land as needed to explore, drill, mine, extract, remove, beneficiate, process, and dispose of the oil shale and products of oil shale located under the leased lands. Standard Lease Terms provide for reasonable measures to minimize adverse impacts to surface and subsurface resources. These include, but are not limited to, modifications to the siting or design of facilities, schedule of operations, and specifications of interim and final reclamation measures. Federal environmental protection laws such as the Clean Water Act, Clean Air Act, Endangered Species Act, and Historic Preservation Act, will be applied to all lands and operations and are also included in the Standard Lease Terms.

The BLM's planning process requires that these oil shale RD&D projects are evaluated to determine if oil shale development would conflict with the protection or management of other resources or public land uses. The RD&D EAs analyzed the proposed RD&D projects and identified mitigating measures to reduce the potential for impacts to resources or other public land uses. These comprehensive mitigation measures will be added as special stipulations to the leases in addition to Standard Lease Terms. BLM

determined the special stipulations that will ensure oil shale RD&D operations are conducted in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, and visual elements of the environment, as well as to other land uses or users.

Permits from state or local governments

It was asserted that EAs for Chevron and Shell's RD&D proposals stated that the BLM would be allowed to waive the requirement to obtain *right-of-way* permits from state or local governments. The BLM is not asserting the right to waive permitting requirements for any other element of the project, including critical elements such as air quality, hazardous waste disposal, and water quality. Because the language that caused this confusion was taken from a form the BLM has previously used for issuance of right-of-way grants (Form 2800-14) and is not necessary to the assessment, it has been stricken from the revised EAs.

While the BLM is not authorized to either implement or waive state or local laws, we do, in fact, require our lessees to comply with them under virtually all circumstances. Because some of the technologies in the RD&D proposals are so new, public involvement and comment are especially important to producing the strongest possible analysis of their effects. By releasing the EAs in preliminary form, the BLM invited the public and state and local authorities to identify where and how the analysis could be strengthened before final decisions are made on RD&D leasing.

The BLM holds monthly meetings in its Colorado State Office with federal, state, and local agencies on progress in the RD&D effort. In addition, close collaboration with state and local governments is continuing as the BLM prepares a Programmatic Environmental Impact Statement for commercial oil shale leasing. The table at the end of the Comment Responses indicates typical permits that are required.

EIS vs. EA

Some commenters stated that there is a possibility of unknown impacts from the projects and for that reason the BLM should develop an EIS. Commenters may not adequately consider that what Congress mandated, and what the BLM is implementing, is leasing for research and development of technologies to recover liquid fuels from oil shale. If all the impacts from those technologies were known or knowable, there would be no need for research and development. In Section 369(a) of the Energy Policy Act of 2005, Congress required the BLM to lease Federal oil shale properties for the purpose of experimentation with promising technologies. The essence of experimentation is the possibility that previously unknown results might occur.

BLM has tried to anticipate, minimize, and monitor to the extent possible the likely impacts of the operations proposed for oil shale RD&D projects. Federal agencies may conduct experiments with new technologies pursuant to an EA when there are sufficient

monitoring programs and plans to mitigate adverse impacts if any are discovered. An EA remains the appropriate NEPA documentation when measures are taken to mitigate adverse impacts, even if they cannot completely compensate for the project's effects. For the RD&D projects in Colorado, the areal extent has been limited to 800 acres maximum and requires extensive monitoring and mitigation programs. Furthermore, it is entirely appropriate for an agency to assume that companies will comply with permitting standards regarding permits which the project must have in order to go forward. Although the BLM cannot guarantee that there will be no adverse impacts, the measures imposed on the RD&D projects will limit the effects so as to be insignificant.

Other comments suggested that the BLM must prepare an EIS for a number of reasons.

- *An EIS would facilitate long-term planning.* BLM is in the process of preparing a programmatic EIS for commercial leasing of Federal oil shale and tar sands. That document will facilitate long-term planning regarding Federal oil shale lands and their surrounding communities.
- *Public involvement requires an EIS.* BLM exceeded the public involvement requirements for an EA. It held public meetings, circulated drafts, and took comments from the public. Commenters have not explained what purpose additional public involvement would serve if BLM were to prepare an EIS.
- *The BLM should complete a single EIS for the five oil shale RD&D projects.* The monitoring, mitigation, and permitting requirements for the RD&D projects will reduce any adverse impacts to the human environment to an insignificant level. Furthermore, the EAs address the cumulative impacts for all of the RD&D projects under consideration. Each RD&D project is limited to 160 acres, which is an insignificant portion of the resources contained on or within the lands where Federal oil shale could be extracted, and even of the BLM administrative unit. Moreover, each RD&D project would employ a different new technology, are not the same project, and would likely have fewer cumulative impacts than the same technology employed simultaneously at five different sites.

Narrow statement of Purpose and Need

Some commenters argue the RD&D EAs utilized an impermissibly narrow statement of Purpose and Need. BLM derived the statement of Purpose and Need from the mandate in section 369(a) of the Energy Policy Act of 2005 to lease Federal oil shale for research and development, and the willingness of Shell, Chevron, and EGL to test promising technology at the scale of 160 acres. Other technologies proposed by other applicants were considered for other areas, but those proposals and the decisions about which ones to approve for RD&D projects are not part of the present EA. The Purpose and Need is not derived exclusively from the companies' interests. Commenters failed to disclose a Purpose and Need statement that would meet the Congressional mandate in light of the companies' proposals to test technology.

Reasonable Range of Alternatives

Some comments assert that the EAs failed to consider enough alternatives. Documentation prepared under the National Environmental Policy Act (NEPA) need only evaluate alternatives that would satisfy the needs and purposes of the project, even if there is only one alternative that satisfies those needs and purposes. The commenters proposed no other alternative which would meet the needs and purposes of the project. The BLM has found no additional, distinct satisfactory alternative to evaluate in detail.

Preference Right Acreage

Some comments assert that the Preference Right Acreage (PRA) leasing is "reasonably foreseeable" and should be analyzed at this time. As stated in the lease document and elsewhere, if and when any of the companies are granted that preference right, an EIS will be completed before issuance of the lease to that additional acreage. The development of the preference acres is a mere possibility, contingent upon a number of factors, including a showing of commercially feasible and environmentally sound extraction technologies. The proposed lease of 160-acre parcels does not irretrievably commit the resources within the PRA.

Comments that are outside the scope of the RD&D EAs

Comments pertaining to the Programmatic EIS (PEIS) for commercial oil shale leasing and comments on the RD&D nomination review process are not within the scope of the RD&D EAs. Each of these programs is (or was) accompanied by a separate process and included ample opportunities for public involvement and comment.

The PEIS will prospectively evaluate the impacts of commercial-scale development of Federal oil shale. The present EAs assess the impacts of the RD&D 160-acre projects. The present EAs do not depend upon the PEIS for the answers to any issue properly addressed in the EAs.

Table 3: Public Comment Issue Summary

Seq. No.	Comment Category	Comment Number	Comment Summary	Comment Response
1.	AQ	FD01-03	It is unclear if a Prevention of Significant Deterioration (PSD) increment analysis was performed for Class I areas; the results of such analysis should be disclosed.	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptor locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. In addition, the background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including other regional operating emission sources.) Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
2.	AQ	FD01-04 ST02-21 IN21-29	Remove statement saying impacts would not be important because reduced visibility would occur during winter months or during possible precipitation events. Neither of these conditions would provide for a less stringent visibility standard under state or federal law.	A cumulative air quality impact assessment was presented (Table, Page 150), indicating a potential for a "just noticeable change" in visibility to occur from 13 to 20 days per year, and the EA stated "given the conservative assumptions incorporated into the cumulative visibility impact analysis … and considering the magnitude, frequency, duration, and timing of the predicted impacts, it is unlikely that perceptible visibility impacts would actually occur from the Proposed Action when combined with other activities in the Piceance Basin." In addition, a re-analysis of potential impacts from the proposed EGL RD&D Project has reduced the conservatively modeled cumulative visibility impacts from 11 to 16 days per year, which again are unlikely to actually occur. The BLM recognizes regulatory agencies may use other significance criteria when analyzing potential impacts from a proposed facility subject to New Source Review for the Prevention of Significant Deterioration under Section 165 of the Clean Air Act (as described in the FLAG Guidance Report.) However, there is no "state or federal law" which specifies which visibility significance criteria must be used. BLM determines the analytical procedure for analyzing potential air quality impacts on a case-by-case basis, considering all available scientific methods appropriate for the specific situation.
3.	AQ	FD01-05 ST02-13	The model used in the air quality analysis was conservative; work with the United States Forest Service (USFS) in developing a protocol for the CALPUFF model and disclose results within the NEPA process before making a decision. The AERMOD results for Dinosaur NM and Flat Tops Wilderness Class I area may significantly underestimate impacts. AERMOD is not designated as a model for long-range transport. Modeling results are deemed inadequate by the APCD.	The BLM determined using the conservative AERMOD model was adequate for the EA analysis. Although the CALPUFF model would produce less conservative results, its use is considerably more intensive. If the more conservative analysis demonstrates that significant impacts are unlikely to actually occur, a less conservative analysis is not necessary. Therefore, CALPUFF was not used for this project. In addition, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model. The general public and agencies should make their modeling preferences known to BLM during the applicable NEPA scoping period.
4.	AQ	FD01-06	EA incorrectly states that visibility is impacted when more than 1 day/year is greater than 1.0 deciview (dv). Revise table to state that the standard is any day equal to 1.0 dv or greater.	The EA text has been revised to indicate "equal to or greater than 1.0 deciview."
5.	AQ	FD01-07 IN21-31	USFS identifies days at or greater than 0.5 dv. Include an assessment of visibility impacts of 0.5 dv or greater and disclose results. All Federal Land Managers, including the USFS, consider a 0.5 dv change to be a Limit of Acceptable Change threshold. BLM should present the results of the visibility modeling based on 0.5 dv. The 0.5 dv standard was predicted to be exceeded on 52 days per year in the cumulative impact analysis.	Not all "Federal Land Managers … consider a 0.5 dv change to be a Limit of Acceptable Change threshold." However, the BLM recognizes the Forest Service's use of 0.5 dv as a significance threshold when analyzing potential direct impacts from a proposed facility subject to New Source Review for the Prevention of Significant Deterioration under Section 165 of the Clean Air Act (as described in the FLAG Guidance Report.) However, 0.5 dv represents one half of a "just noticeable change" in visibility. BLM uses a 1.0 dv "just

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				noticeable change" as a NEPA analysis threshold because any lower level would not be perceptible.
6.	AQ	ST02-11	An analysis of carbon monoxide was not mentioned in the EA. Results of modeling should be mentioned for construction or operational periods for compliance with NAAQS and CAAQS.	It was determined that the highest potential carbon monoxide (CO) impacts would occur during the construction/drilling phase. For this case, the modeled highest second-high 1-hour impact was 2,859 ug/m3 and 8-hour was 1,375 ug/m3. With existing background concentrations included, this represents a predicted total concentration of nearly 10 percent of the 1-hour, and nearly 25 percent of the 8-hour standards.
7.	AQ	ST02-14	Receptors placed every 2,000 meters around the Shell Development sites are not adequate to determine long-range maximum impacts. The National Park Service (NPS) recommends spacing of 1,400 meters.	Flat Tops Wilderness Area modeling receptors were obtained from the NPS ARD data set. However, given the large number of receptors presented, a subset was used to optimize AERMOD processing. In addition, several receptors were adjusted to correspond to the Wilderness Area boundary, and others were added for locations of high elevation. Both of these adjustments were made to conservatively identify points of maximum potential impact. BLM is aware of the CDPHE-APCD's Colorado Class I SO_2 area image maps, but not specific modeling receptor inventories. Therefore, the Dinosaur National Monument was digitized specifically for this project (emphasizing boundaries and points of high elevation.) In addition to these receptors, Shell also modeled a denser near-field receptor network designed to capture maximum modeled impacts. Shell's near-field receptor network followed CDPHE-APCD guidelines (Modeling Guideline for Air Quality Permits, December 27, 2005), including receptor spacing as follows: 50 m spacing around the facility fence line; 100 m spacing from the fence line to 1.5 km; 250 m spacing between 1.5 to 3 km from the fence line; and 500 m spacing between 3km to 10 km from the fence line.
8.	AQ	ST02-17	Potential visibility impacts above "just noticeable change" between 8 and 14 days/year is a significant adverse impact.	A cumulative air quality impact assessment was presented (Table, Page 150), indicating a potential for a "just noticeable change" in visibility to occur from 13 to 20 days per year, and the EA stated "given the conservative assumptions incorporated into the cumulative visibility impact analysis … and considering the magnitude, frequency, duration, and timing of the predicted impacts, it is unlikely that perceptible visibility impacts would actually occur from the Proposed Action when combined with other activities in the Piceance Basin." In addition, a re-analysis of potential impacts from the proposed EGL RD&D Project has reduced the conservatively modeled cumulative visibility impacts from 11 to 16 days per year, which again are unlikely to actually occur. The BLM used its best professional judgment to interpret the results from the highly conservative AERMOD model, considering the magnitude, frequency, duration, and timing of the predicted impacts, and determined it is unlikely that perceptible visibility impacts would actually occur.
9.	AQ	ST02-18 ST02-22	The percent change in extinction should be reported [for direct impacts]. Potential impacts should not be given as ranges. Impacts should be disclosed and evaluated using the recommendation of the FLAG report.	The BLM recognizes the recommendations (as described in the FLAG Guidance Report) when analyzing potential direct and cumulative impacts from a proposed facility subject to New Source Review for the Prevention of Significant Deterioration under Section 165 of the Clean Air Act (as described in the FLAG Guidance Report.) BLM uses a 1.0 dv "just noticeable change" as a NEPA analysis threshold because any lower level would not be perceptible, and reports potential impacts as a range to assist the public and agencies with their interpretation. Anyone is welcome to review BLM's visibility analysis data, which quantifies potential visibility impacts regardless of the preferred threshold.
10.	AQ	ST02-26	Potential air emissions of hydrogen sulfide are not addressed in the EA.	Potential emissions of hydrogen sulfide would occur from the In-Situ Conversion Process (ICP) process phase of activities. These are quantified as less than CDPHE-APCD's 10 tons per year non-criteria pollutant threshold; therefore, potential impacts are not quantified.
11.	AQ	ST02-28	The permit for AmerAlia Rock School Project Construction Permit Application was cancelled in 2003; calculations for the emissions inventory should be recreated.	The inventory is recreated in the attached emissions spreadsheet.
12.	AQ	ST02-29	Total VOC emissions for the facility during the ICP processes phase are not calculated.	The calculation of VOC emissions from the ICP process is provided on the attached

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			The calculation methodologies for the ICP processes phase are unclear.	emission spreadsheet (previously the VOC emissions had been associated only with the incinerator).
13.	AQ	IN21-02	The air quality analyses are incomplete; it is likely that air quality impacts would be predicted to be more severe than in the EA.	The air pollutant emissions as modeled are higher than the potential to emit from any of the three emissions scenarios: drilling, construction, or operation. This was done to limit the number of emission scenarios to be modeled, yet provide a conservative analysis. For example, the emissions from both drilling and site construction are evaluated together although these two activities would not occur simultaneously, but sequentially. Thus the predicted impacts are also higher than realistic combinations of these sources.
14.	AQ	IN21-03	It is not clear if the emissions estimates in the calculations sheets for the "ICP Processes" cover all of the in-situ conversion processes for the three sites described in the EA. Cannot determine that the modeled emissions represent a comprehensive assessment of all ICP processes. The BLM must include emissions from all three sites in its near field and cumulative modeling analyses.	The air pollutant emissions as modeled addressed all of those from the in-situ process, and the ICP processing at all three sites was modeled simultaneously.
15.	AQ	IN21-04	There is no mention in the EA of the boilers' and incinerators' function in the ICP process or any of their operating characteristics; thus cannot be sure that the modeled emissions reflect the test sites' operations under worst-case operating conditions.	Shell is committed to installing boilers and incinerators with emissions equal to or lower than these estimates. Regardless of method, BLM will require emissions to be no greater than those analyzed, and specific control measures may be addressed as a condition of approval during the permitting process with CDPHE-APCD. Finally, BLM will not approve any activity which does not comply with all applicable local, state, and federal air quality regulations.
16.	AQ	IN21-05 IN21-16 OG02-09	The BLM must quantify fugitive releases of ammonia from the refrigeration process, fugitive VOC and hazardous air pollutant (HAP) emissions from the storage tanks, PM, NO_x and SO_2 emissions from the stand-by diesel generator, all emissions from the gas-fired burners, compressors and heaters and all pumps that are not electric. The BLM must include all of these emissions in the air quality modeling analyses, which may include VOC, HAP, and CO_2; none of which are quantified or discussed in the EA. BLM needs to fully assess the increased emissions from this part of the oil shale process and include them in the air quality analyses. The EA fails to provide measures for how Shell will control fugitive emissions from its in-situ retort process.	There would be negligible fugitive emissions from the in-situ process since wells will be installed and manifolded together to collect all products and vapors. These products and vapors will be routed to the processing plant. Fugitive emissions from the process plant and the hydrocarbon plant were originally grouped with the incinerator emissions; however, these are now separated out as provided on the attached emission spreadsheet . Maximum facility emissions will be lower than those used in the impact modeling.
17.	AQ	IN21-06 IN21-10	It is not a reasonable assumption that all drilling and construction-related engines used will meet Tier 1 standards, unless the BLM imposes those requirements. Use of engines that do not meet these standards could have much greater impact on air quality. No commitment to establish federally enforceable limits has been made in the EA. The BLM's assumptions are not justified without being identified as mitigation.	Shell is committed to using Tier I or better emission standards for drill rig engines. Therefore, BLM would require this committed mitigation as part of a use authorization. The enforcement will be addressed during the permitting process with the CDPHE-APCD. In addition, BLM will not approve any activity which does not comply with all applicable local, state, and federal air quality regulations.
18.	AQ	IN21-07	Exhaust emissions of NO_x, CO, and PM from drilling are much larger than any other source of air emissions from the Shell test sites, particularly PM. The BLM must model uncontrolled exhaust emissions from drilling which, for $PM_{2.5}$, could result in violations of the NAAQS.	Uncontrolled Tier I engine emissions were modeled, although no significance thresholds were exceeded.
19.	AQ	IN21-08	The SO_2 emission rate used for exhaust emissions from drilling is 11.67 grams/million BTU heat input. There is no discussion of the basis for this emission factor and it appears to grossly under-predict SO_2 emissions. The BLM must use an emission factor for SO_2 emissions from engine exhaust of 131.8 g/MMBtu, instead of 11.67. The BLM must correctly model these emissions to determine compliance with the CAAQS and NAAQS. The PM emissions from topsoil unloading used in the near field modeling analysis are	Highway-grade diesel fuel with 0.05 percent sulfur is commonly available and would be used for all on-road and non-road site machinery. This quality of fuel was assumed for the calculation of SO_2 emissions from all internal combustion engines to be used on site. In general, conservative assumptions were used to evaluate impacts. For instance, all three projects were evaluated simultaneously, which will not occur. Tier 1 engine emissions were used, and in 2007 on-road diesel fuel will be reduced to 0.0015% sulphur. These factors combined will have an overall reduction in impacts. Therefore, the modeling did address the maximum potential SO_2 emissions impacts.

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			much lower than what we calculate using the same AP-42 emission factors. To calculate an emission rate in pounds of PM per ton of topsoil removed, the units for wind speed must be expressed as mph.	The commenter is correct. Entering wind speed in units of mph increases potential PM_{10} emissions by 0.1 ton per year, as shown on the attached emission spreadsheet. However, given the minimal underestimation of topsoil unloading emissions compared to project-wide PM emissions, this would not significantly change the modeling results.
20.	AQ	IN21-09	The material moisture content used in the calculation is out of the range of source conditions for AP-42 Section 13.2.4 Equation 1. The BLM must use a material moisture content that is more representative of the site-specific conditions of the test sites, which could result in PM_{10} and $PM_{2.5}$ emissions rates that are almost six times higher than what was modeled.	The commenter is correct. The moisture content used in the calculation is out of range. Using the maximum of the moisture content range of 4.8%, and silt content at 16.4% for topsoil unloading and overburden bulldozing, the emissions from topsoil unloading decrease and from bulldozing increase, but with a decrease in the total of the two.
21.	AQ	IN21-11	The BLM did not model any fugitive road dust emissions from construction vehicle traffic. The BLM must ensure that fugitive emissions from construction vehicle road traffic occurring on and off the leased property during construction are adequately estimated and consistently included in the near field modeling analysis.	The drilling scenario included support vehicles traveling on and off site. Since impacts from the construction phase were combined with the drilling phase, realistic support vehicle activity was modeled appropriately for the construction phase.
22.	AQ	IN21-12 IN21-13 IN21-15 IN21-18	The Shell EA does not discuss the electricity needs for the construction and maintenance of the freeze wall and for the use of the down-well electric heaters at its three RD&D test sites. The BLM needs to analyze the impacts of the increased air emissions associated with the electricity needs of the Shell RD&D projects. The BLM needs to assess the increased air emissions and greenhouse gas emissions from power plants in the region associated with the maximum possible electric power usage and include these emissions in its air quality impact analyses. The BLM did not model any coal-fired power plants for the cumulative impacts analysis. Several existing coal-fired power plants could impact the same Class I areas as the Shell projects and should have been modeled in the BLM's cumulative analysis.	BLM evaluated the electrical power requirements likely to be required by all five oil shale RD&D projects, and determined those requirements would be met by available existing sources. If the RD&D technology is shown to be successful, an EIS must be prepared to analyze impacts of potential commercial scale operations before a decision approving such operations can be authorized.
23.	AQ	IN21-22	Assuming certain sources were reflected in background concentrations is not consistent with current practice for analyzing emissions impacts. Background air monitoring data is generally added to the results of a cumulative source modeling analysis in determining compliance with the NAAQS. However, if the source being modeled is not isolated, then modeling of existing sources is necessary to determine the potential contribution of background sources. Thus, unless the BLM can demonstrate that the impacts of all existing sources are reflected in the monitoring data, and show that the monitoring data are reflective of maximum concentrations in the area and have been properly collected and quality-assured, the BLM cannot use the background monitoring data to reflect all existing sources in or affecting the region.	The background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including the project area.) As shown in the Table on Page 14, these background data were used to determine the maximum potential air quality impacts. For the near-field analysis, the maximum impacts occur at or near the site boundaries and decrease rapidly with downwind distance; therefore, these sites are considered isolated.
24.	AQ	IN21-23	The Shell EA identifies several existing sources of air emissions that could be affecting air pollutant concentrations in the vicinity of the Shell projects. However for some pollutants, the air monitoring data was collected from areas far removed from the Shell project sites, or is over 20 years old. The BLM did not indicate that any analysis of this monitoring data had been done to verify that it had been properly collected and quality-assured and to verify that it reflected maximum concentrations of these pollutants. BLM	The background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including the project area.)

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			failed to justify its reliance on this monitoring data to reflect background concentrations in the vicinity of the Shell Projects.	
25.	AQ	IN21-24	The BLM did not provide any analysis of the mitigation measures ("Subalternative – Proposed Action Mitigation – Sites 1, 2, and 3"). These measures are clearly aimed at reducing PM_{10} and $PM_{2.5}$ concentrations for which concentrations close to the 24-hour average NAAQS were predicted. The EA does not indicate that any analysis was performed to verify this. It is imperative that BLM provide an analysis of the mitigation measures along with a revised PM_{10} and $PM_{2.5}$ emissions inventory.	The analysis assumed uncontrolled fugitive dust emissions and demonstrates compliance using these emissions. However, Shell has committed to control these emissions at 50 percent control using water as a dust suppressant. If emissions were controlled, modeled impacts would be decreased and compliance will continue to be ensured. This is a conservative estimate as other dust inhibitors are available with higher control efficiencies. BLM will require at least 50 percent control to mitigate fugitive dust impacts. In addition, dust control may be addressed as a condition of approval during the permitting process with CDPHE-APCD.
26.	AQ	IN21-37	The EA did not include any analysis of impacts from air emissions sources of VOCs and NO_x on ground level ozone concentrations. Yet the EA states that ozone concentrations in the region are approaching violations of NAAQS for ozone.	High ozone levels have been episodic and their specific causes have not been determined. However there are a number of existing sources that may contribute to the occasional high ozone levels observed and include mobile combustion sources and oil and gas operations. There are currently no acceptable methods to predict potential ozone impacts on a local level. Ozone analysis is applicable on a regional scale using a photochemical model to fully capture effects of ozone producing chemicals from both local and distant sources. BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan.
27.	AQ	IN21-39	The EA did not evaluate hazardous air pollutant emissions or impacts. An analysis of such emissions, including fugitive emission releases of hazardous volatile organic compounds, must be included in the EA, and maximum concentrations must be predicted. The EA is incomplete without such an analysis.	Potential HAPs emissions would occur at rates less than the CDPHE-APCD's 10 tons per year non-criteria pollutant threshold; therefore, potential impacts are not quantified. However, the projects would not emit fluorides or acid mists, for which CDPHE-APCD has lower threshold levels.
28.	AQ	IN21-42	Although the BLM's air quality analyses predicted significant air quality impacts to visibility and sulfur and nitrogen deposition in the Flat Tops Wilderness Area, the EA did not include any discussion or evaluation of potential mitigation measures. The Shell EA must include a discussion and evaluation of mitigation measures to avoid or minimize these impacts. The EA must include a discussion of all mitigation options.	A cumulative air quality impact assessment was presented (Table, Page 150), indicating a potential for a "just noticeable change" in visibility to occur from 13 to 20 days per year, and the EA stated "given the conservative assumptions incorporated into the cumulative visibility impact analysis … and considering the magnitude, frequency, duration, and timing of the predicted impacts, it is unlikely that perceptible visibility impacts would actually occur from the Proposed Action when combined with other activities in the Piceance Basin." In addition, a re-analysis of potential impacts from the proposed EGL RD&D Project has reduced the conservatively modeled cumulative visibility impacts from 11 to 16 days per year, which again are unlikely to actually occur. No further mitigation is needed.
29.	AQ	CO01-03	The EA states that dust inhibitors would be used as necessary on unpaved roads to prevent fugitive dust emissions. Request that the BLM clarify whether or not non saline-containing materials may be used — magnesium chloride on Airplane Ridge Road. Because of its superior dust control properties, magnesium chloride is the preferable dust suppressant.	Although not modeled, Shell has committed to use of a dust control on its access and site roads. At a minimum, a 50 percent control efficiency could be achieved using water as a dust suppressant, although other dust inhibitors are available with higher control efficiencies. BLM will require at least 50 percent control to mitigate fugitive dust impacts. In addition, dust control may be addressed as a condition of approval during the permitting process with CDPHE-APCD.
30.	AQ	OG02-10	The EA does not provide an accounting of how much CO_2 would be used or released to the atmosphere (either through direct use or through fugitive emissions).	Given the lack of regulations controlling potential CO_2 emissions, the uncertainty in quantifying potential emissions, and a lack of analysis methods to relate emissions to impacts, potential impacts on climate can not be quantified; however, based on the relatively small scale of the proposed RD&D project compared to world-wide CO_2 emissions, no significant impacts to climate change are likely to occur.
31.	AQ	FD01-01 ST02-19 ST02-20 IN21-01 IN21-32	A FONSI is inappropriate given the results of the air quality modeling. Cumulative emissions could contribute to adverse visibility for up to 20 days per year; this should be considered a significant impact. The BLM has shown that the Shell projects will have significant adverse effects on	BLM conducted a specific analysis of potential air quality impacts from the proposed Shell facilities directly (near-field) and cumulatively (far-field) with other reasonably foreseeable emission sources as part of its overall NEPA analysis. As identified in the EA, only a single significance threshold was originally predicted to be exceeded. Although the cumulative analysis indicated a potential for a "just noticeable change" in visibility to occur from 13 to 20 days per year within the mandatory federal PSD Class I Flat Tops Wilderness Area, the EA

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		ST21-28	visibility at the Flat Tops Wilderness Area Class I area both as direct project impacts and cumulatively considering all other oil shale research projects and the ExxonMobile Piceance Development Project activities	stated "given the conservative assumptions incorporated into the cumulative visibility impact analysis … and considering the magnitude, frequency, duration, and timing of the predicted impacts, it is unlikely that perceptible visibility impacts would actually occur from the Proposed Action when combined with other activities in the Piceance Basin." In addition, a re-analysis of potential impacts from the proposed EGL RD&D Project has reduced the conservatively modeled cumulative visibility impacts from 11 to 16 days per year, which again are unlikely to actually occur. The air quality impact analysis indicated that no significant impacts are likely to occur.
32.	AQ	IN21-30	It is not the state's responsibility to prevent future and remedy existing visibility impairment at all Class I areas. The BLM is required under NEPA to analyze and disclose all significant air quality impacts, regardless of whether another agency might address an adverse environmental impact in the future.	Under federal law it is the applicable air quality regulatory agency's responsibility to implement provisions of the Clean Air Act under EPA's oversight, as described in approved implementation plans. This includes achieving the National Visibility Goal of no manmade visibility impairment within mandatory federal PSD Class I Areas by the year 2064 under EPA's Regional Haze Regulations. BLM did not rely on the state's efforts to achieve the National Visibility Goal. BLM conducted a specific analysis of potential significant visibility impacts from a Proposed Action as part of its overall NEPA analysis, independent of a state's review of facilities subject to New Source Review for the Prevention of Significant Deterioration under Section 165 of the Clean Air Act.
33.	AQ	IN21-33	The EA indicates that the cumulative sulfur and nitrogen deposition at the Flat Tops Wilderness Area would not cause significant adverse impacts, but the BLM relied on unreasonably high thresholds. BLM claims these impacts are insignificant based on an acceptability threshold of 3 kg/ha-yr. The BLM provided no information to indicate where the 3 kg/ha-yr thresholds were derived from, and the BLM's acceptability thresholds seems high. These impacts are significant when compared to the NPS's Class I area "Deposition Analysis Thresholds" of 0.005 kg/ha-yr for nitrogen and sulfur deposition. The total nitrogen and sulfur deposition impacts at the Flat Tops Wilderness Area would be significant, and this must be disclosed to the public and considered in the decision on issuing a FONSI.	Fox et al., 1989 ("A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas") was prepared by a group of scientists and land managers to establish levels (3 kg/ha-yr) at which total nitrogen and sulfur deposition would be unlikely to cause significant air quality impacts. The BLM recognizes the Forest Service's current use of Deposition Analysis Thresholds (DAT at 0.005 kg/ha-yr) as a significance threshold when analyzing potential direct impacts from a proposed facility subject to New Source Review for the Prevention of Significant Deterioration under Section 165 of the Clean Air Act (as described in the FLAG Guidance Report.) However, 0.005 kg/ha-yr represents an assumed natural background deposition level, made even more conservative by applying both a "variability factor" and a "cumulative factor." This may be appropriate for regulatory permit review, but there is no legal justification to use an ultra-conservative "natural background" DAT for NEPA analyses. BLM uses 3 kg/ha-yr as the NEPA analysis threshold because it is the level below which significant impacts are not likely to occur. BLM will continue to review the scientific literature to determine if this analysis threshold needs to be adjusted.
34.	CML	ST01-05	The cumulative impact analysis needs to address traffic volumes [300-650 vehicles per day] on existing roads and include impacts of traffic from existing gas and oil shale development activities in the immediate vicinity.	Both the near-field and cumulative impact analyses addressed air pollutant emissions from traffic-related emission sources.
35.	CML	ST01-07	Look beyond just the RD&D projects to plan for future needs; look at cumulative effects of Shell and Chevron's projects combined with other activity in the Piceance Basin.	The Cumulative section of the EA did address the five RD&D projects. The White River RMP is being revised and will include all foreseeable projects in the Piecance Basin. The cumulative section of the EA did address the five RD&D projects. Other projects are also listed in the table in the cumulative section. A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. In addition, the background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including other regional operating emission sources.) Finally, BLM is planning to

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				conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
36.	CML	ST01-08	The analysis of cumulative socioeconomic impacts needs further consideration of mitigation measures [regarding local governments' ability to maintain adequate level of service to affected cities and counties].	Oil shale companies that are already engaged in energy development in northwestern Colorado, specifically Chevron and Shell, have maintained a positive relationship with local governments. Concerns voiced over social and economic impacts include concerns over employee housing, road maintenance and improvement, law enforcement and emergency response. Some suggestions brought forward to mitigate these concerns are not within the authority of the BLM to guarantee or to include in a lease as a condition of approval. However, these and other suggestions submitted, that are also beyond the BLM's authority, merit consideration by the companies in an effort to maintain good relationships with the local agencies struggling to keep up with the recent increase in development. The BLM will continue to facilitate to the maximum extent possible collaboration and communication between local governments and companies operating within their jurisdictions.
37.	CML	ST01-15	Two large new interstate natural gas pipelines originating at the Meeker hub were built in 2005-2006 and not included in the EA. Enterprise is currently building a large natural gas processing facility with 500-600 employees; this was not included in the EA. References to the level of mineral development currently occurring in the Piceance are incorrect.	Mineral development is constantly changing in the region. The EnCana/Enterprise facility is listed in the table on page 146 of the August 15, 2006 EA.
38.	CML	ST02-15	A complete (NAAQS/CAAQS and PSD Increment) cumulative analysis was not completed. A detailed air quality analysis was not performed.	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. In addition, the background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including other regional operating emission sources.) Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
39.	CML	ST02-16	Modeling results for PM_{10} and SO_2 exceed modeling significance levels. An impact analysis that includes the proposed source and all nearby sources as well as applicable background concentration should be conducted for cumulative impacts.	No potential air pollutant concentrations were predicted to exceed modeling significance levels.
40.	CML	IN21-17	The cumulative modeling analysis should include all sources that would have an impact on either the area around the oil shale research and development project in the Piceance Basin or on the affected Class I areas in the region. The cumulative impacts analysis should have looked at a greater set of Class I areas,	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. The cumulative air quality impact assessment provided a conservative estimate of potential impacts at the closest downwind mandatory federal PSD Class I Flat Tops Wilderness Area. Other Class I areas further downwind and in other directions would only decrease this estimation even further.
41.	CML	IN21-19	With respect to new sources, at least two new coal-fired power plants have been	BLM evaluated the electrical power requirements likely to be required by all five oil shale

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			proposed that must also be included in the list of sources to be evaluated for potential impacts on the Class I areas of concern. Specifically, EPA recently proposed issuance of a permit for the new Unit 2 at the Bonanza Power Plant, and a permit application has been submitted for a new Unit 4 at the Hunter Power Plant.	RD&D projects, and determined those requirements would be met by available existing sources. If the RD&D technology is shown to be successful, an EIS must be prepared to analyze impacts of potential commercial scale operations before a decision approving such operations can be authorized. As part of EPA's New Source Review process, an analysis of potential air quality impacts (including cumulative) would be made.
42.	CML	IN21-20 IN21-21	Significant gas development is occurring and more development is planned for western Colorado and southwestern Wyoming. The air emissions sources associated with this development likely impact some of the same Class I areas of concern that will be impacted by the Shell projects. Draft or final RMPs and/or EISs are available for these planned developments, and the BLM has gathered data on the existing oil and gas sources for them. The BLM could have included the existing and projected emissions from the oil and gas development both on and off BLM lands in its sources modeled for the cumulative analysis. BLM must revise its cumulative impacts analysis to include all of these existing and projected sources of air pollution in the region in order for its analysis to be complete	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. In addition, the background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including other regional operating emission sources.) Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model. The general public and agencies should make their modeling preferences known to BLM during the applicable NEPA scoping period
43.	CML	IN21-25	BLM indicated that it conducted cumulative air impact analyses within the Piceance Basin. However, the maximum cumulative impacts predicted by the BLM are much less than the impacts predicted from operation of just the EGL and Chevron projects for certain pollutants. BLM did not model total worst case emissions from the EGL and Chevron Project operations and/or did not evaluate pollutant concentrations at the receptors of maximum concentration. BLM's cumulative modeling failed to capture the receptors with maximum concentrations.	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area. The maximum impact from any one of these cumulative emission sources would be greater close to the individual project (reported as direct concentrations on Page 19.)
44.	CML	IN21-26	BLM eliminated the predicted concentrations at some receptors because the BLM considered those receptors to be on "company property." However, the BLM cannot ignore predicted concentrations for this reason. BLM must determine whether such concentrations occur in the "ambient air," that is air external to buildings to which the general public has access. Public access to property needs to be blocked for the air above that property to not be considered ambient air. Thus, just because a high concentration occurs on "company property" does not mean the concentration can be ignored.	BLM uses applicable ambient air quality standards as a threshold of significance in NEPA analyses. Since these standards are not applicable on private property, those receptor locations were not used in the analysis.
45.	CML	IN21-27	BLM did not include all other existing and reasonably foreseeable sources of air emissions in the region in its cumulative analyses and the emissions inventory for the Shell projects is flawed and incomplete.	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. In addition, the background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including other regional operating emission sources.) Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
46.	CML	IN21-34	The BLM only analyzed air quality impacts on the Flat Tops Class I area and on the federal Class II Dinosaur National Monument. There are other Class I areas that could be affected by the oil shale research and development projects and other existing and	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-

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			reasonably foreseeable sources in the region. Given the BLM's predicted significant visibility impacts and nitrogen and sulfate deposition at Flat Tops Wilderness Area, the cumulative far-field analysis must cover other Class I areas in the region that could be impacted.	field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area. The maximum impact from any one of these cumulative emission sources would be greater close to the individual project (reported as direct concentrations on Page 19.)
47.	CML	IN21-35 IN21-36	The air quality modeling analyses for both the near-field and cumulative far-field analyses only used 1 year of meteorological data from 2004. BLM should have modeled more years of meteorological data to ensure that worst case meteorological conditions are reflected in the modeling results. EPA recommends that 5 years of meteorological data be used in modeling exercises. It is questionable whether the Bar D station relied on for the BLM's modeling assessment is considered on-site to the Shell oil shale projects. The BLM did not provide any analysis or discussion to indicate that the Bar D station was representative of the meteorological conditions at all of the Shell Project sites, or that the meteorological data collected at the Bar D site met all quality assurance requirements. For the cumulative analyses and assessment of impacts on Class I areas, EPA's regulations require use of at least 3 years of mesoscale meteorological data or 5 years of National Weather Service (or comparable) data when evaluating long range transport of air emissions. "The model user should acquire enough meteorological data to ensure that worst-case meteorological conditions are adequately represented in the modeling results." The BLM's cumulative air quality analyses do not meet these standards for air quality modeling demonstrations and could have underestimated the impacts from the Shell projects alone and cumulatively with other sources in the region.	The meteorological data used is the most representative data for the project area given the location from which these data were collected. EPA's Guideline on Air Quality Models (40 CFR 51 Appendix W) addresses the regulatory application of air quality models for assessing criteria pollutants under the Clean Air Act. The Guideline does recommend that "at least 3 years of meteorology data (need not be consecutive) may be used if mesoscale meteorology fields are available" when analyzing long range transport. However, this guidance is not required by EPA regulations, nor is it necessarily applicable to NEPA analyses. BLM determines the analytical procedure for analyzing potential air quality impacts on a case-by-case basis, considering all available scientific methods appropriate for the specific situation.
48.	CML	IN21-38	BLM should have considered the other oil and gas development currently existing and reasonably foreseeable for the area in an analysis of compliance with the ozone NAAQS. Recent studies have indicated that the amount of light alkane hydrocarbons and methane from oil and gas development can be quite significant, which can create optimal conditions for ozone formation. Other areas in the region are also experiencing elevated ozone concentrations, sometimes in excess of the ozone NAAQS. Thus, ozone concentrations must be a concern to be evaluated for the Shell EA. The EA should have assessed the public health and environmental impacts that could occur due to ozone formation from the Shell Projects and all existing and reasonably foreseeable growth in contributing ozone precursor emissions to the region.	Currently there are no acceptable methods to predict potential ozone impacts on a local level. Ozone analysis is applicable on a regional scale using a photochemical model to fully capture the effects of ozone producing chemicals from both local and distant sources. The BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan.
49.	CML	IN21-40 OG02-11	There is no mention of CO_2 emissions or other greenhouse gas emissions in the Shell EA. BLM should include an assessment of the increased greenhouse gas emissions from any oil shale production site. Considered collectively with the other oil shale RD&D projects, the BLM needs to show that these cumulative emissions do not have a significant impact on the environment. The EA does not compare the CO_2 releases expected from Shell's proposals to those releases expected from the other proposed RD&D projects or from other methods of producing oil.	Given the lack of regulations controlling potential CO_2 emissions, the uncertainty in quantifying potential emissions, and a lack of analysis methods to relate emissions to impacts, potential impacts on climate can not be quantified; however, based on the relatively small scale of the proposed RD&D project compared to world-wide CO_2 emissions, no significant impact to climate change are likely to occur.
50.	CML	OG02-38	The EA's section on cumulative impacts to air quality improperly limits its analysis to the potential impacts of the five RD&D projects and the 5,000-well Piceance Development Project, rather than considering impacts on air quality from all of the projects identified	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-

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			in Table 30. This limitation renders the air quality discussion arbitrary. The EA admits that the Shell project, along with the other oil shale RD&D projects and existing and proposed sources of air pollution in the area, will have significant impacts on visibility in the Flat Tops Wilderness Area. The EA found that on 13-20 days per year, there would be a greater than 10% change in visibility at Flat Tops as a result of the oil shale and other sources in the area. The EA's attempt to explain exceedances of the "Limit of Acceptable Change" in the Flattops Wilderness Area cannot stand. The EA acknowledges that predicted impacts would exceed visibility limits up to 3 weeks a year, but explains that many of those days were predicted to occur in the winter, when visitor use in the Wilderness Area is "minimal." The EA fails to quantify visitor use in this Wilderness Area, so this conclusion is arbitrary and unsupported.	field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. In addition, the background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including other regional operating emission sources.) Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
51.	CML	OG02-39	It was improper for the BLM to rely on a 1.0 deciview change as defining whether there will be significant impacts on the visibility in Flat Tops Wilderness Area. All Federal Land Managers, including the USFS, consider a 0.5 deciview change to be a Limit of Acceptable Change threshold. The BLM should have presented the results of the visibility modeling based on the 0.5 dv level of concern. According to data provided by the BLM, the 0.5 dv standard was predicted to be exceeded on 52 days per year in the BLM's cumulative impact analysis.	Not all "Federal Land Managers … consider a 0.5 dv change to be a Limit of Acceptable Change threshold." However, the BLM recognizes the Forest Service's use of 0.5 dv as a significance threshold when analyzing potential direct impacts from a proposed facility subject to New Source Review for the Prevention of Significant Deterioration under Section 165 of the Clean Air Act (as described in the FLAG Guidance Report.) However, 0.5 dv represents one half of a "just noticeable change" in visibility. BLM uses a 1.0 dv "just noticeable change" as a NEPA analysis threshold because any lower level would not be perceptible.
52.	CML	OG02-40	The BLM's reliance on the state's efforts to achieve the National Visibility Goal is misplaced, since the federal agency may not under the Clean Air Act authorize activities that are likely to result in degradation of air quality in a Class I airshed, in violation of the PSD program of the Clean Air Act. The BLM is required to analyze and disclose all significant air quality impacts, regardless of whether another agency might address an adverse environmental impact in the future.	BLM did not rely on the state's efforts to achieve the National Visibility Goal. BLM conducted a specific analysis of potential significant visibility impacts from a Proposed Action as part of its overall NEPA analysis, independent of a state's review of facilities subject to New Source Review for the Prevention of Significant Deterioration under Section 165 of the Clean Air Act.
53.	CML	OG02-41	The cumulative visibility impacts will likely be worse than predicted because the BLM failed to include all existing and reasonably foreseeable air emissions in the region. Significant gas development is occurring and more is planned for the region, yet the EA failed to analyze the air emissions associated with this development -- deferring instead to the upcoming amendment of the White River Resource Area.	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. Although the cumulative analysis indicated a potential for a "just noticeable change" in visibility to occur from 13 to 20 days per year, the EA stated "given the conservative assumptions incorporated into the cumulative visibility impact analysis … and considering the magnitude, frequency, duration, and timing of the predicted impacts, it is unlikely that perceptible visibility impacts would actually occur from the Proposed Action when combined with other activities in the Piceance Basin." In addition, a re-analysis of potential impacts from the proposed EGL RD&D Project has reduced the conservatively modeled cumulative visibility impacts from 11 to 16 days per year, which again are unlikely to actually occur. Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
54.	CML	OG02-42	The EA claims that the cumulative sulfur and nitrogen deposition at the Flat Tops Wilderness Area would not cause significant adverse impacts, but BLM relied on unreasonably high thresholds for determining significance. The maximum total nitrogen deposition at Flat Tops Wilderness Area was predicted to be 0.265 kg/ha-yr and the maximum total sulfur deposition was predicted to be 0.033 kg/ha-yr. The BLM claims these impacts are insignificant based on an acceptability threshold of 3 kg/ha-yr. BLM	Fox et al., 1989 ("A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas") was prepared by a group of scientists and land managers to establish levels (3 kg/ha-yr) at which total nitrogen and sulfur deposition would be unlikely to cause significant air quality impacts. The BLM recognizes the Forest Service's current use of Deposition Analysis Thresholds (DAT at 0.005 kg/ha-yr) as a significance threshold when analyzing potential direct impacts from a proposed facility subject to New Source Review for

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			provided no information to indicate where the 3 kg/ha-yr thresholds were derived from, and the BLM's acceptability threshold seems incredibly high when compared to guidance on this matter issued by the NPS in 2001. These impacts are significant when compared to the NPS's Class I area "Deposition Analysis Thresholds" (DATs) of 0.005 kg/ha-yr for both nitrogen and sulfur deposition. According to NPS guidance, the total nitrogen and sulfur deposition impacts at the Flat Tops Wilderness Area would be significant at the Flat Tops Wilderness Area. This information must be disclosed to the public in the EA and considered in the BLM's decision on whether to issue a FONSI.	the Prevention of Significant Deterioration under Section 165 of the Clean Air Act (as described in the FLAG Guidance Report.) However, 0.005 kg/ha-yr represents an assumed natural background deposition level, made even more conservative by applying both a "variability factor" and a "cumulative factor." This may be appropriate for regulatory permit review, but there is no legal justification to use an ultra-conservative "natural background" DAT for NEPA analyses. BLM uses 3 kg/ha-yr as the NEPA analysis threshold because it is the level below which significant impacts are not likely to occur. BLM will continue to review the scientific literature to determine if this analysis threshold needs to be adjusted.
55.	CML	OG02-43	The BLM's analysis of cumulative impacts to air quality looked only at the proposed oil shale RD&D activities and the 15,000-well Piceance Development Project. The cumulative modeling analysis must include all sources that would have an impact on either the area around the shale research projects in the Piceance Basin or on the affected Class I and II areas in the region. The Shell EA fails to conduct this analysis. This deficiency renders the analysis of cumulative impacts to air quality inadequate.	A cumulative air quality impact assessment was presented (Table, Page 150) based on potential operational emissions from all five oil shale RD&D projects, as well as the current ExxonMobile Piceance Creek Development Project. Maximum predicted cumulative far-field impacts were presented for receptors locations within the Piceance Basin, Dinosaur National Monument, and the Flat Tops Wilderness Area, and compared to applicable NAAQS/CAAQS and PSD Increments as NEPA thresholds of significance. In addition, the background estimate for air quality of Piceance Basin was provided by the CDPHE-APCD, and constitutes the best available data to establish regional background air quality conditions (including other regional operating emission sources.) Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
56.	CML	OG02-45	The BLM must assess the increased air emissions and greenhouse gas emissions from power plants in the region associated with the maximum possible electric power usage and include these emissions in its air quality analysis, both for direct and cumulative impacts. This is especially true with regard to the assessment of cumulative impacts, since the source of these emissions is not at the Shell oil shale RD&D sites and other projects included in the modeling will also increase electricity demands in the region. BLM's analysis of cumulative impacts is seriously deficient in failing to assess the increase in regional emissions due to increased power production. The maximum cumulative impacts predicted by the BLM are much less than the impacts predicted from operation of just the individual projects for certain pollutants.	BLM evaluated the electrical power requirements likely to be required by all five oil shale RD&D projects, and determined those requirements would be met by available existing sources. If the RD&D technology is shown to be successful, an EIS must be prepared to analyze impacts of potential commercial scale operations before a decision approving such operations can be authorized. As part of EPA's New Source Review process, an analysis of potential air quality impacts (including cumulative) would be made.
57.	CML	OG02-46	The EA's conclusion that "negligible adverse air quality impacts are likely to actually occur" is arbitrary and capricious.	BLM conducted an specific analysis of potential air quality impacts from the proposed Shell facilities directly (near-field) and cumulatively (far-field) with other reasonably foreseeable emission sources as part of its overall NEPA analysis. As identified in the EA, only a single significance threshold was originally predicted to be exceeded. Although the cumulative analysis indicated a potential for a "just noticeable change" in visibility to occur from 13 to 20 days per year within the mandatory federal PSD Class I Flat Tops Wilderness Area, the EA stated "given the conservative assumptions incorporated into the cumulative visibility impact analysis … and considering the magnitude, frequency, duration, and timing of the predicted impacts, it is unlikely that perceptible visibility impacts would actually occur from the Proposed Action when combined with other activities in the Piceance Basin." In addition, a re-analysis of potential impacts from the proposed EGL RD&D Project has reduced the conservatively modeled cumulative visibility impacts from 11 to 16 days per year, which again are unlikely to actually occur. Finally, BLM is planning to conduct a regional air quality impact assessment to analyze potential amendments to its White River Resource Management Plan, using CALPUFF or another more intensive but less conservative model.
58.	CML	OG02-33	The EA's analysis of cumulative impacts fails to comply with NEPA; Improper geographic scope for analysis of cumulative impacts:	BLM believes the assessment of cumulative impacts to be adequate. NEPA itself, and the CEQ regulations codified in 40 CFR 1500, do not provide specific instruction on exactly how to assess cumulative impacts.

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				BLM provided a rational reason in the EA for designating the White River Resource Area as the unit of analysis. Because 100 percent of the five proposed actions occur within its borders, and the cumulative effects of nearby projects can be specifically evaluated in relation to the proposal, use of the WRRA helps to set the context and intensity of potential impacts. Although the WRRA is the designated analysis area, impacts on adjacent areas have not been ignored. Many of the past present and future projects traverse boundaries and cross into adjacent areas and jurisdictions. BLM has assessed the cumulative impacts for those projects as well.
59.	CML	OG02-35	Failure to Evaluate Impacts of Commercial Activities on Preference Right Areas	The development of preference rights acres is a mere possibility, contingent on a number of factors. However, BLM publicly disclosed preferential rights development as a foreseeable activity. The RD&D concept was designed in part to inform the analysis of any potential commercial development. An EIS will be prepared prior to issuance of the preference lease, and information gained in the RD&D will support that analysis. Lacking any reasonable information about the form of potential commercial development, BLM cannot analyze in detail such potential actions at this time.
60.	CML	OG02-36	Failure to Consider Impacts of Reasonably Foreseeable Development Activities: BLM discusses only the cumulative impacts of the five oil shale RD&D projects. BLM's failure to analyze the cumulative impacts of ALL of the past, present, and reasonably foreseeable future actions renders the EA's cumulative impacts section inadequate under NEPA – examples include air quality, floodplains, water resources, and vegetation. The EA repeatedly relies on the fact that the five RD&D projects represent only 1.8% of the surface area of the total represented by past, present, and reasonably foreseeable projects, and only 0.045% of the entire WRRA. This analysis ignores the cumulative impacts resulting from the other 98.2% of the surface disturbances in the area. This is a clear violation of NEPA, particularly where the BLM has acknowledged the significant impacts from these other past, present, and foreseeable projects.	Conditions and projects in the Basin are constantly changing. The White River RMP amendment is intended to consider the cumulative impacts of all projects. This EA considers the cumulative impacts of many issues, but specifically focused on the fact that there are five RD&D projects being proposed in the foreseeable future. It will not be known, until after the RD&D projects have been in existence for a few years, whether the potential exists for greater oil shale development. Therefore, large scale oil shale production is not a given factor in the foreseeable future.
61.	CML	OG02-47	Cumulative impacts from spills or leaks: The EA's treatment of cumulative impacts from accidental spills or leaks associated with refueling and maintenance of equipment, storage of fuel, oil or other fluids is devoid of details or estimates.	Estimating the potential for accidental spills or leaks is nearly impossible since these events are never planned. The construction and drilling phases, where most of the potential for spills or leaks would occur, are brief and with proper maintenance of equipment and secondary containment for fuel storage, the possibility of a spill or leak would be minimized. Mitigation for accidental spills and leaks is provided in Appendix A, and is implied by industry standards. All projects in the area are subject to applicable federal, state, and local laws and regulations; and industry standards require good housekeeping practices for the maintenance of the project area in a sanitary condition at all times to protect workers and the environment.
62.	CML	OG02-48 OG02-49 OG02-50 OG02-51	Cumulative impacts from other projects: The BLM cannot prepare a FONSI for Shell's RD&D proposals given the agency's acknowledgement that significant cumulative impacts are likely to occur from reasonably foreseeable development activities within the analysis area. The EA fails to provide quantified and detailed information on cumulative impacts. The mere listing of data or including a chart showing projects in the area does not satisfy NEPA. The EA fails to evaluate cumulative impacts of other ongoing large-scale development proposals, relying on the analysis conducted in the 1997 RMP for the White River	The actions proposed in the three EAs for Oil Shale RD&D, as well as cumulative impacts to the Resource Area, are tiered to the White River RMP/EIS and are within the scope and analysis of the existing RMP/EIS. The cumulative impacts analysis was comprehensive and appropriate given available information and reasonably foreseeable activities. The actions proposed in the three EAs for oil shale RD&D, as well as cumulative impacts to the Resource Area, are tiered to the White River RMP/EIS and are within the scope and analysis of that document. BLM believes the assessment of cumulative impacts to be adequate. NEPA itself, and the CEQ regulations codified in 40 CFR 1500, do not provide specific instruction on exactly how to assess cumulative impacts. Cumulative impact discussions are by nature, very often qualitative. There is no way to accurately predict all future conditions and situations.

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			Resource Area.	
63.	CML	OG02-52	The BLM is preparing an amendment to the RMP to account for the significant increases due to the oil and gas boom. This is an inappropriate use of tiering.	The actions proposed in the three EAs for Oil Shale RD&D, as well as cumulative impacts to the Resource Area, are tiered to the White River RMP/EIS and are within the scope and analysis of the existing RMP/EIS.
64.	DAT	FD03-01 FD03-02 FD03-03 FD03-13 FD03-14	Provide BLM with monitoring records and data in a timely manner and digital format. Characterize surface water and ground water resources prior to, during, and after lease development. Coordinate monitoring plans with those developed for other RD&D leases. Comparison of data between sites that represent different periods of record should be used with caution. Reinitiate data collection at the discontinued sites in the vicinity of the leases.	Shell will develop a detailed water monitoring and response program in cooperation with BLM, USGS, CDPHE, and industry. The monitoring and response plan will address monitor well locations, water-bearing units to be monitored, monitor well design, analytes, water level measurements, frequency of sampling and analysis, sampling techniques, analytical methods, QA/QC processes, and reporting requirements. The water monitoring and response plan will not be restricted to groundwater, but will address surface water upstream and downstream from the Shell sites, springs, seeps, and groundwater-surface water interactions.
65.	DET	FD03-10	The section on pages 4-31 (water quality) needs more detail.	Comment not specific.
66.	DET	FD01-02	No further discussion on direct and indirect air quality impacts to air quality related values is provided as indicated on page 18 of the EA.	Impacts were adequately described in the EA.
67.	DET	ST02-12	The sources modeled for both construction and operation are not adequately described in the EA to determine emissions source on a technical basis.	An emissions inventory summary is attached to this comment/response summary.
68.	DET	ST02-02	Sentence on page 57, 3rd paragraph notes three parameters but the subsequent sentence lists four.	Text will be changed to read “four” parameters.
69.	DET	ST02-08	Page 67, 4th paragraph is missing the concluding punctuation.	Punctuation will be added to the text.
70.	DET	IN07-05	Inadequate information, inconsistencies, and referenced material, exhibits, etc.	Information needed for an EA review was included. Additionally, complete Plans of Operations were available for review through the BLM.
71.	DET	CO01-04	It is not clear whether the EA distinguishes between “reserve” pits and cuttings management pits.	All pits that contain produced water will have mitigation applied that pertains to excluding migratory birds from pits.
72.	DET	OG02-02	The BLM must prepare a single environmental document prior to implementing the RD&D Leasing Program on five parcels in the Piceance Basin.	BLM is analyzing five individual, independent RD&D proposals. Each project employs a different new technology, and thus the proposals are not the same project with the same impacts. Separate NEPA documents enabled BLM to focus and include more detail on the individual proposals than would be practicable in a single, collective document. It is appropriate for BLM to analyze the impacts of approving each individual project as well as the cumulative impacts of all five proposals. Furthermore, BLM determined separate documents could be prepared more efficiently utilizing third-party contractors with BLM staff providing supervision and oversight.
73.	DET	OG02-04	BLM should demand more specifics from Shell before it authorizes three 10-year experiments.	The purpose of the RD & D projects is to have an opportunity to assess the viability and impacts of oil shale extraction technology. They are, by design, experiments.
74.	DET	OG02-12	The EA fails to identify the precise location of the RD&D leases or the preference right areas attached to them. The EA does not provide detailed township-range-section information.	The development of preference right acres is a mere possibility, contingent on a number of factors. However, BLM publicly disclosed preferential rights development as a foreseeable activity. The RD&D concept was designed in part to inform the analysis of any potential commercial development. An EIS will be prepared prior to issuance of the preference lease, and information gained in the RD&D will support that analysis. Lacking any reasonable information about the form of potential commercial development, BLM cannot analyze in detail such potential actions at this time.

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				Location of the RD&D sites are disclosed in the EA; the preference rights acres are not shown since they are not a part of this action.
75.	ENGY	GO02-44 IN21-14 OG02-05	The EA does not discuss the energy needs for its proposed RD&D activities, such as the electricity required for construction and maintenance of the freeze wall and for use of electric heaters to heat the shale at its three test sites. The BLM must assess the increased air emissions and greenhouse gas emissions from power plants in the region associated with the maximum possible electric power usage and include these emissions in its air quality analysis, both for direct and cumulative impacts.	The Shell RD&D project sites will use electricity from the existing capacity in the grid. Power will be purchased through the White River Electric Association. At the current time, the existing system has over 10% excess capacity. Individual permits have already been obtained by the power plants and the projected emissions for full use of the facilities have been accounted for in the cumulative air analysis. No new power plants will be built to meet the electrical needs of the RD&D projects.
76.	GEN	OG01-01	Club 20 supports a “go slow” approach and designating local cities, counties, and State agencies as “cooperating agencies” in the review process. Club 20 has found the EAs and process to be comprehensive and thorough, and recommends issuance of the RD&D leases.	Comment noted.
77.	GEN	IN11-01 IN15-01 IN05-01	I urge the BLM to allow Shell Frontier to proceed without an EIS.	Comment noted.
78.	GEN	IN08-01	The BLM must proceed with an evaluation of only the technology presented in response to the Federal Register notification and ignore request to review all technologies prior to the issuance of a FONSI.	Comment noted.
79.	GEN	IN08-02 IN14-01 IN23-01 IN13-01 IN04-01 IN25-01 IN12-02	I endorse your FONSI, agree with your findings, and believe you are correct in not selecting the No Action Alternative; the No Action Alternative is inappropriate; the FONSI should be approved.	Comment noted.
80.	GEN	IN03-01 IN19-01 IN26-02 IN10-02 IN06-01 IN20-01 IN18-01 IN17-01 IN09-02 IN01-01	I encourage the BLM to allow Shell Frontier to move forward, to advance the knowledge of oil shale.	Comment noted.
81.	GEN	IN24-01 IN22-02 IN18-01 IN09-01	The test sites do not significantly affect the quality of the human environment; potential adverse impacts can be reduced or mitigated to an insignificant level.	Comment noted.
82.	GEN	IN26-01 IN25-02 IN12-01	The RD&D should be completed prior to the Programmatic Environmental Impact Statement (PEIS).	Comment noted.

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83.	GEN	IN22-01 IN10-01	The purpose and need conforms and is consistent with the approved Resource Management Plan.	Comment noted.
84.	GEN	IN13-02 IN12-03	The project will not set precedence for future actions.	Comment noted.
85.	GEN	IN07-02	Directly interrelated to the environmental impact of the Royal Dutch Shell (RDS) ICP process/project are the issues of (1) energy efficiency; (2) char production; (3) waste of the national kerogen energy/chemical feedstock resource; and (4) economic viability.	These issues are addressed individually in the responses below.
86.	GEN	IN07-04	The environmental impact of an RD&D lease must consider the ultimate outcome of extrapolation to commercial scale environmental impacts on a regional and national level.	The development of preference rights acres is a mere possibility, contingent on a number of factors. However, BLM publicly disclosed preferential rights development as a foreseeable activity. The RD&D concept was designed in part to inform the analysis of any potential commercial development. An EIS will be prepared prior to issuance of the preference lease, and information gained in the RD&D will support that analysis. Lacking any reasonable information about the form of potential commercial development, BLM cannot analyze in detail such potential actions at this time.
87.	GEN	IN07-08	Marketability of the product is poor.	The question of marketability is not being evaluated in this NEPA analysis; rather the potential impacts of the RD&D projects are being considered and discussed.
88.	GEN	IN07-10	Large areas of land will be denuded at the RD&D sites.	There will be surface disturbances at all three sites; however, at least 50 acres at Site 2 will not be impacted due to an existing lease with Colorado State University at that site. Shell will commit to a variety of mitigation measures to revegetate and ensure that the acreage returns to its current land use.
89.	GEN	IN16-41	Page 4-15 — These economic projections are a significant breakthrough!	Comment noted.
90.	LES	OG02-14	BLM failed to disclose the terms in RD&D leases or to justify a FONSI.	Standard Lease Terms have been developed to provide the lessee the right to use the leased land as needed to explore, drill, mine, extract, remove, beneficiate, process, and dispose of the oil shale and products of oil shale located under the leased lands. Standard Lease Terms provide for reasonable measures to minimize adverse impacts to surface and subsurface resources. These include, but are not limited to, modifications to the siting or design of facilities, schedule of operations, and specifications of interim and final reclamation measures. Federal environmental protection laws such as the Clean Water Act, Endangered Species Act, and National Historic Preservation Act, will be applied to all lands and operations and are also included in the Standard Lease Terms. The BLM's planning process requires these oil shale RD&D projects to be evaluated to determine if oil shale development would conflict with the protection or management of other resources or public land uses. The RD&D EAs analyzed the proposed RD&D projects and identified mitigating measures to reduce the potential for impacts to resources or other public land uses. These comprehensive mitigation measures will be added as special stipulations to the leases in addition to Standard Lease Terms. The BLM has determined the special stipulations that will ensure oil shale RD&D operations are conducted in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, and visual elements of the environment, as well as to other land uses or users.
91.	LES	IN07-11 IN07-12 IN07-17	Commenter questions the criteria for leases.	The criteria for the leases is not part of this NEPA evaluation. The selection of leases occurred earlier in the year, under a separate process. At this stage, impacts of the RD&D projects are being discussed and considered.
92.	LES	IN07-03	The Shell ICP process has been selected for an RD&D lease when it meets none of the	The criteria for the leases are not part of this NEPA evaluation. The selection of leases

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			three BLM RD&D program requirement.	occurred earlier in the year, under a separate process.
93.	LES	IN16-02	Methods for greater total resource recovery must be improved before proceeding to a commercial lease, where the unrecovered residual would be in the billions of barrels range.	The economic viability of the RD&D projects was considered during the leasing application process. The RD&D projects themselves will determine if the commercial production will be economically viable.
94.	LES	OG02-05	Each of these leases will come with preference rights on nearly 5,000 acres of adjacent federal land -- for a total of nearly 15,000 acres. This appears to be the only chance the agency and public might have to scrutinize both the experimental methods proposed for use and the terms under which these leases will be issued.	Decisions on the leasing of the preference rights will not be made until after the RD&D projects have been operational for a number of years and there is assurance that the projects are economically viable and the environmental impacts are acceptable. The public will have an opportunity to be involved in the NEPA process that will occur if those projects move forward into commercial leasing.
95.	NEPA	ST02-30	The CDPHE recommends that BLM select a "Subalternative to the Proposed Action" that maximizes mitigation options, assuming an adequate air and water quality analysis is prepared.	Comment noted.
96.	NEPA	IN07-01 IN07-08	The finding of no significant impact has already been determined and written up by the BLM—even before the 30-day public response input has been received.	The FONSI was a draft which signals BLM's beliefs that no significant impacts were identified in the EA.
97.	NEPA	CO01-01	The EA correctly states that the purpose and need for the project is to advance the knowledge regarding the commercial viability of innovative technologies for the recovery of oil shale and nahcolite.	Comment noted.
98.	NEPA	CO01-02	The BLM has satisfied its obligations under NEPA and has correctly found that the project will not significantly affect the quality of the human environment, individually or cumulatively; therefore, an EIS is not needed and the project should be permitted to move forward.	Comment noted.
99.	NEPA	OG02-01	The EA fails to satisfy legal requirements in a number of respects. The EA does not take a sufficiently hard look at issues. The EA for Shell's RD&D leases is insufficient to justify the issuance of 10-year RD&D leases and plans for in-situ development of federal oil shale resources.	Not a specific comment.
100.	NEPA	OG02-13 OG02-15 OG02-22	The BLM has not, to date, disclosed the terms and stipulations that will be attached to its oil shale RD&D leases, and this deficiency renders the EA arbitrary under NEPA. The BLM did not disclose the lease terms that would mitigate impacts, or include analytic data that would prove their effectiveness. Without disclosing lease terms, the BLM has failed in its duty to inform the public through this NEPA process of the terms under which federal resources will be utilized and the method by which the agency will prevent undue or unnecessary degradation of resources.	Standard Lease Terms have been developed to provide the lessee the right to use the leased land as needed to explore, drill, mine, extract, remove, beneficiate, process, and dispose of the oil shale and products of oil shale located under the leased lands. Standard Lease Terms provide for reasonable measures to minimize adverse impacts to surface and subsurface resources. These include, but are not limited to, modifications to the siting or design of facilities, schedule of operations, and specifications of interim and final reclamation measures. Federal environmental protection laws such as the Clean Water Act, Clean Air Act, Endangered Species Act, and National Historic Preservation Act, will be applied to all lands and operations and are also included in the Standard Lease Terms. The BLM's planning process requires these oil shale RD&D projects to be evaluated to determine if oil shale development would conflict with the protection or management of other resources or public land uses. The RD&D EAs analyzed the proposed RD&D projects and identified mitigating measures to reduce the potential for impacts to resources or other public land uses. These comprehensive mitigation measures will be added as special stipulations to the leases in addition to Standard Lease Terms. BLM determined the special stipulations that will ensure oil shale RD&D operations are conducted in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, and visual elements of the environment, as well as to other land uses or users.
101.	NEPA	OG02-15a	The EA states that "Shell will comply with an approved water monitoring and response	The EA identifies a comprehensive water monitoring and response program as an integral

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			plan," but it does not provide details of this plan or analyze the effectiveness at detecting impacts on groundwater and surface water.	component of the proposed process. This plan will be developed with the BLM, and details on parameters for monitoring will be decided at that time. The monitoring of groundwater resources will continue until such time as the groundwater regime is deemed acceptable for stabilization and abandonment.
102.	NEPA	OG02-19	BLM solicited comments in November 2004 on terms to include in oil shale RD&D leases. On April 27, 2006, we submitted comments to the BLM on the scope of issues the BLM should consider in evaluating the environmental impacts of the RD&D leases.	Comments received in January 2005 were in reference to the nomination process and are outside the scope of this NEPA analysis. BLM reviewed, considered and responded to those comments in Federal Register Notice of June 9, 2005. Comments received in April 2006 were in reference to the Programmatic Oil Shale and Tar Sands EIS and are outside the scope of this NEPA analysis. BLM developed a scoping report as part of the Programmatic EIS process. Concerns raised about groundwater, air quality, wastewater, and special status species were considered as part of the analysis of the RD&D projects.
103.	NEPA	OG02-23	The EA does not contain a "response to comments" section, and the BLM neglected to address issues raised in our scoping comments on the RD&D proposals.	BLM is not required by NEPA to include a response to comments section in an EA. Comments received during the scoping sessions have been considered during the NEPA process, and were addressed in both the EA and the draft unsigned FONSI.
104.	NEPA	OG02-26	Impermissibly Narrow Definition of Purpose and Need: BLM's decision to define the purpose and need for the project exclusively from Shell's perspective is contrary to NEPA.	BLM derived the statement of Purpose and Need from the mandate in section 369(a) of the Energy Policy Act of 2005 to lease Federal oil shale for research and development, and the willingness of Shell, Chevron, and EGL to test promising technology at the scale of 160 acres. Other technologies proposed by other applicants were considered for other areas, but those proposals and the decisions about which to approve for RD&D projects are not part of the present EA. The Purpose and Need is not derived exclusively from the companies' interests. Commenters failed to disclose a Purpose and Need statement that would meet the Congressional mandate in light of the companies' proposals to test technology.
105.	NEPA	OG02-27	Inadequate Range of Alternatives: The narrow definition of purpose and need has foreclosed BLM's consideration of reasonable alternatives. The EA states that BLM considered, but did not analyze, two alternatives -- relocating the proposed lease and modifying the proposed methodologies…NEPA requires analysis of these alternatives in the EA.	Documentation prepared under NEPA need only evaluate alternatives that would satisfy the needs and purposes of the project, even if there is only one alternative that satisfies those needs and purposes. BLM analyzed the proposal, a mitigation alternative, and a No Action Alternative. BLM did not identify any additional modifications to methodology or location that would lessen potential impacts.
106.	NEPA	OG02-28	The environmental impacts of the No Action Alternative are never examined at all -- the EA simply states repeatedly that "no impacts associated with the proposed action would occur." No further explanation of the environmental impacts of the current and ongoing activities in the Piceance Basin is provided, such that the agency and the public could compare among the two alternatives.	BLM thoroughly analyzed the No Action Alternative. However, due to the nature of the proposal, the Affected Environment is the same as the No Action Alternative. No Action would not modify or change the resource conditions detailed in the Affected Environment or environmental impacts analyzed under the White River Resource Area RMP.
107.	NEPA	OG02-29	BLM did not analyze an adequate number of reasonable alternatives.	Documentation prepared under NEPA need only evaluate alternatives that would satisfy the needs and purposes of the project, even if there is only one alternative that satisfies those needs and purposes. BLM analyzed the proposal, a mitigation alternative, and a No Action Alternative. BLM did not identify any additional modifications to methodology or location that would lessen potential impacts.
108.	NEPA	OG02-30 OG02-17	The BLM has neglected to evaluate alternatives as required in the Piceance Basin RMP, which contains the following commitment: Oil shale research tracts will be analyzed based on the merits of the proposed technology and the availability of alternate private lands.	In Section 369 of the Energy Policy Act of 2005, Congress required BLM to lease Federal oil shale lands for the purpose of experimentation with promising new technologies. There is no superseding requirement to evaluate the availability of private lands.

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			The EA does not assess the availability of private lands, as mandated by the Piceance Basin RMP	
109.	NEPA	OG02-31	In scoping comments that we submitted in April 2006, we suggested that the BLM "should weigh the various RD&D leasing proposals against each other, and offer a range of alternatives that considers offering some and not others." This was not one of the alternatives studied and the BLM failed to explain why.	BLM is not required by NEPA to include a response to comments section in an EA. Comments received during the scoping sessions have been considered during the NEPA process, and were addressed in both the EA and the draft unsigned FONSI.
110.	NEPA	OG02-57 OG02-59	BLM should prepare an EIS for the RD&D Leasing Program because its actions amount to the adoption of a new program, which will likely have significant impacts on the environment. BLM should prepare a single EIS for the following reasons: 1. An EIS would facilitate sound long-term planning and resource management. 2. The public benefits significantly from preparation of an EIS. 3. Issuance of oil shale RD&D leases could have a significant impact on the environment. Adoption of the new RD&D leasing program for oil shale and tar sands resources requires preparation of an EIS.	BLM is analyzing five individual, independent RD&D proposals. Each project employs a different new technology, and thus the proposals are not the same project with the same impacts. Separate NEPA documents enabled BLM to focus and include more detail on the individual proposals than would be practicable in a single, collective document. It is appropriate for BLM to analyze the impacts of approving each individual project as well as the cumulative impacts of all five proposals. Furthermore, BLM determined separate documents could be prepared more efficiently utilizing third-party contractors with BLM staff providing supervision and oversight.
111.	NEPA	OG02-58	BLM should follow established procedures for obtaining public input on controversial and potentially significant actions, such as those set out and regularly followed when the BLM prepares an EIS.	BLM has informed the public and held public meetings and afforded the opportunity to comment on the EA, in accordance with 40 CFR 1501.4 (e)(2). In addition, by holding meetings and distributing the EAs for review, BLM exceeded the requirements for public involvement in the RD&D EA process.
112.	NOIS	CO01-06	The EA misstates the scope of the statutes pertaining to permissible noise levels. The referenced Noise Statute provides that construction projects shall be subject to the maximum permissible noise levels specified for the period within which construction is to be completed pursuant to any construction permit properly issued.	Comment noted.
113.	NOIS	CO01-07	There are no potential noise receptors or noise-sensitive areas within 1 mile of the proposed site. The construction exemption specified in the Colorado Noise Statute should apply to Shell's activities. County standards for industrial noise levels of 65 db(A) at the property line also will be in effect. Once construction is completed, the standards applicable to industrial operations under the Statute should also apply to operations. The EA's suggested application of residential standards would make it difficult and expensive to operate machinery and would impose an unnecessary burden. A more appropriate industrial noise level would be the industrial standard of 75 to 80 db(A); the EA should be revised accordingly.	The EA acknowledges that there are no potential noise receptors. The table shows land use by zoning. It is likely that the Rio Blanco County standard of 65 DBA will apply to the RD& D sites. Should there be a reason to reduce noise, BLM will apply the mitigation measures as shown in the EA. BLM expects that the equipment used in the facilities would be designed to meet COGCC noise levels as required.
114.	PERM	ST02-24	CDPHE strongly disagrees with the assertion that BLM can waive state and local laws, and disregard state permit conditions.	The August 15, 2006 EA for Shell's RD&D applications for the oil shale project proposes that the BLM be allowed to waive the requirement to obtain *right-of-way* permits from state or local governments. The BLM is <u>not</u> asserting the right to waive permitting requirements for any other element of the project, including critical elements such as air quality, hazardous waste disposal, and water quality. The BLM is not authorized to either implement or waive state or local laws, BLM does require our lessees to comply with them under virtually all circumstances. Because some of the technologies in the RD&D proposals are so new, public involvement and comment are especially important to producing the strongest possible analysis of their effects. By releasing the EAs in preliminary form, the BLM invited the public and state and local

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				authorities to identify where and how the analysis could be strengthened before final decisions are made on RD&D leasing. The BLM holds monthly meetings in its Colorado State Office with federal, state, and local agencies on progress in the RD&D effort. In addition, close collaboration with state and local governments is continuing as the BLM prepares a Programmatic Environmental Impact Statement for commercial oil shale leasing.
115.	PERM	ST02-27	The permitting section is incomplete.	A list of potential permits is now included in the EA.
116.	RMP	OG02-16	The Shell EA fails to include an evaluation of the merits of the proposed technology, as required by the Piceance Basin RMP. The EA fails to estimate how likely it might be to lead to commercially viable methodologies. BLM has specifically deferred making any prediction as to whether the process will work, will be economically viable, or will have acceptable impacts.	This comment is more applicable to the oil shale RD&D nomination process and is outside the scope of the oil shale RD&D EAs.
117.	RMP	OG02-18	The EA fails to establish the required environmental baseline. The Piceance Basin RMP established carrying capacities for several resources and states that an initial baseline will be established to provide a realistic projection of the present carrying capacity situation.	The Piceance Basin RMP established carrying capacities that were carried forward into the White River RMP. The RMPs mention that only unmitigated impacts count against the carrying capacities, NOT mitigated impacts. The EA analyzes the affected environment and identifies appropriate mitigation measures to minimize impacts. BLM has no reason to believe that unmitigated impacts exist or that this action will exceed identified carrying capacities.
118.	SOC	ST01-01 ST01-02 ST01-03 ST01-04 ST01-06 ST01-09 ST01-10	Concerns voiced over social and economic impacts include concerns over employee housing, road maintenance and improvement, law enforcement, and emergency response include: -BLM should require consultation with RBC Road and Bridge Dept. and include resulting mitigation measures. -Require employee carpooling to work site, especially during construction (make it mandatory). -Require all companies operating in the area to collaborate on solutions to the management of excessive road impacts. -Require companies using County roads to extract Federal minerals to contribute up-front to the cost of maintaining roads impacted by development activities. -BLM needs to compensate local governments that are deprived of revenue due to the waiver of all mineral severance taxes and land rental payments so long as projects are in research status. -BLM should require more industry cooperation with local governments that provide services to those industries whose projects occur on BLM lands.	It is not within the authority of the BLM to guarantee or to include these recommendations in a lease as a condition of approval. The BLM will continue to facilitate to the maximum extent possible collaboration and communication between local governments and the companies operating within their jurisdictions.
119.	SOC	ST01-11	Current growth rate (30-40% increase) is “disruptive” social change (growth between 5-15%) regardless of new oil shale activity.	Socioeconomic statistics are often subject to reporting delays of a year or two after the fact. Consequently, socioeconomic effects of the recent increase in energy development that has occurred in northwest Colorado are not fully reflected in most published statistics. The most recent statistical data was used in the analysis and this information was augmented with interviews with local officials and service administrators. Colorado State Demography Office statistics indicated that during 2004 the housing vacancies for Meeker and Rangely were 13 and 17 percent respectively. The EA goes on to recognize that according to local authorities "There were virtually no vacant rental units in Rangely during the fall of 2005 and clearly illustrates the cumulative impacts of an increase in the workforce on housing throughout Rio Blanco, Garfield, and Mesa counties.”

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120.	SOC	ST01-13	Eliminate the need for 700 daily commuters into the area; design a “mancamp” on Federal land to provide temporary housing rather than transfer the problem to the County.	The BLM has the authority to consider a temporary use authorization for such an action, but the agency has determined it is unwarranted in this case. Shell has notified the BLM that it is planning additional temporary housing that would alleviate the majority of the housing requirements resulting from the RD&D projects. See Comment # CO01-14.
121.	SOC	ST01-14	The Socioeconomic Technical Report prepared for ExxonMobile’s CTF project is almost 1 year old and does not fully reflect continued expansion of oil and gas development in the western half of the County. Gas production in the County increased by 24% from 1999-2005; during the same period, the number of barrels of produced water increased by 5,000,000.	Socioeconomic statistics are often subject to reporting delays of a year or two after the fact. Consequently, socioeconomic effects of the recent increase in energy development that has occurred in northwest Colorado are not fully reflected in most published statistics. The most recent statistical data was used in the analysis and this information was augmented with interviews with local officials and service administrators in an attempt to illustrate the cumulative impacts of the increase in mineral development on the socioeconomics of the region.
122.	SOC	ST01-15	The EA assumes a housing vacancy rate of 38.5% in Rio Blanco County, based on 1988 data. The current rate is closer to zero.	Socioeconomic statistics are often subject to reporting delays of a year or two after the fact. Consequently, socioeconomic effects of the recent increase in energy development that has occurred in northwest Colorado are not fully reflected in most published statistics. The most recent statistical data was used in the analysis and this information was augmented with interviews with local officials and service administrators. Colorado State Demography Office statistics indicated that during 2004 the housing vacancies for Meeker and Rangely were 13 and 17 percent respectively. The EA goes on to recognize that according to local authorities "There were virtually no vacant rental units in Rangely during the fall of 2005 and clearly illustrates the cumulative impacts of an increase in the workforce on housing throughout Rio Blanco, Garfield, and Mesa counties.”
123.	SOC	CO01-14	The EA should be revised to clarify and note that Shell presently has 83 existing beds at the “lower camp” temporary living quarters on Corral Gulch. Construction start-up of an additional 104-bed facility is anticipated to begin in October 2006. An additional 400- to 450-bed facility is planned for the 84 Ranch area, several miles east of the proposed RD&D sites. This will provide approximately 600 beds in temporary living quarters. The current site has, and future sites will have, adequate capacity to house the temporary construction employees; they will not generally stay in the towns.	BLM did not have this information at the time the August 15, 2006 EA was printed. This information is relevant to addressing the socioeconomic issues in the area, and as such, will be added into the EA text.
124.	SOC	CO01-16	Shell’s mitigation measures will mitigate to insignificance any possible socioeconomic burden on any adjacent communities. These mitigation measures adequately address any concerns raised in the text of the EA, and the EA should be revised to incorporate Shell’s mitigation measures.	Comment noted.
125.	SOC	CO01-17	The EA should be revised to reflect that Shell has in the past and will continue in the future to work responsibly and responsively with all potentially affected local municipalities to identify any additional appropriate mitigation measures. It is not necessary to address the optional measures in the EA to offset demands on employment and housing.	Comment noted.
126.	SPIL	ST02-01	All spills must be reported to the CDPHE; include this in spill response plans.	Any spills would be reported to CDPHE. Text was added to the Hazardous Waste section and Soils section of the EA.
127.	TECH	IN07-06	The major environmental issues not addressed in the Shell EA, or which were incorrectly evaluated, or for which there is no basis for drawing conclusions are: (1) raw oil shale hydrotreating and heavy metal removal before it can be marketed as refinery feedstock was not considered (ultimate disposition of the raw shale oil, its marketability, and environmental consequences); (2) there is no basis provided for assuring water flushing of underground residual spent shale will reduce toxic and other contaminants remaining in the huge quantities of char and other remaining pyrolysis products from this pyrolysis process to levels required such that groundwater will not become	The intent of the EA is to assess impacts from the RD&D projects. It is fully understood that not all impacts are known at this time. The very nature of a research project is to find out more about what might happen on a larger scale. Different technologies are being tried at the five RD&D sites; some may very well be more effective than others.

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			contaminated beyond environmental standards in the future; (3) there is no basis provided for assuring complete collection of all gas/oil product not removed by the primary production means can be removed by the water injection scheme proposed. If not removed it becomes a future contamination source, plus its economic value is lost; (4) it is incorrect to conclude that total denuding of three tracts of 160 acres each is of no significant impact (EA deficiencies); (5) the wasting of the economic value of the gas produced by incineration—400 to 900 BOE/day for 2-6 years for three projects with a future value of $32-532 million (depends on which Shell numbers are used) was not considered. It is incorrect to conclude that this has no impact on US citizens' quality of human environment. It is also incorrect to conclude that the production from the three projects will not produce oil in quantities that would contribute to domestic supplies. Depending on which RDS oil production numbers you use, the combined oil production could be as high as 2700 BPD which is of the order of 8% of the State of Utah's total production, or 5% of Colorado's.	
128.	TECH	IN07-13	Fundamental technical issues with most in-situ processes and other big picture issues: There are fundamental technical reasons why the Shell ICP and many other in-situ processes cannot, and do not, meet the acceptance criteria standards.	Comments on the feasibility of extraction technologies are outside the scope of this EA.
129.	TECH	IN07-14	Ohmic heating criticized; other technologies are better.	The comparison of technologies is not part of this NEPA evaluation.
130.	TECH	IN07-15	Commenter states that 160-acre parcels will be sacrificial zones for testing the commercial viability of oil shale.	Adequate safeguards in the form of mitigation have been put in place to prevent significant impacts to the environment and the safety of the process will be assure before any larger scale projects would be considered.
131.	TECH	IN07-16	In-situ pyrolysis suggested.	Oil- shale char is a poor substitute for coal because of its low heating value.
132.	TECH	IN07-09	Residual char will leave environmental contamination; water flushing will not decontaminate the pyrolyzed zone.	Oil shale is intertwined with a disproportionately high amount of inorganic materials (e.g. dolomite, feldspar, quartz) which are akin to ash in coal. It is Shell's opinion that the optimal method of extracting economic value out of oil shale is a method that separates the organic matter from the inorganic minerals at the lowest feasible operating temperature in order to prevent the decomposition of these minerals; Shell's ICP is such a method. Approximately 30 to 40% of the kerogen mass is left behind as char.
133.	TECH	IN16-03	The Aluminum resource (Dawsonite) in the Piceance Basin is huge, and BLM must assure, prior to commercial leasing, that adequate research is done toward its recovery. Research indicates that aluminum might be recovered as a part of the planned leaching process at a much lower energy expenditure than from Bauxite.	The technologies being tested are not the subject of the NEPA analysis. The impacts of the projects are the subject of the NEPA analysis. The research associated with these RD&D projects will determine what is viable for recovery.
134.	TECH	IN16-05	The "Economically Viable" criteria for converting to a commercial lease must take into account the public interest in "economically sound recovery" of the resource. The major public stake is in recovering a large percentage of the total resource. Under the present concept, a lessee could theoretically comply with the "economic/environmental" criteria, i.e. make a profit with acceptable environmental effects merely by recovering a small part of the approximately 10 billion bbl equivalent on a commercial lease, and probably leave the remaining resource more difficult to recover by future generations.	Many factors will be evaluated after the RD&D projects have been in operation prior to the issuance of commercial leases. Economic viability and the efficiency of extraction will be evaluated. The purpose of this EA is to assess the potential impacts of the RD&D projects.
135.	TECH	IN16-12	What zone and how thick is the "hydrocarbon bearing target?"	This section is a General Technology description. The thickness of specific hydrocarbon-bearing intervals will be assessed by Shell at each RD&D site.
136.	TE	CO01-26	EA should note recent survey for federally listed T&E species, and that based on that survey, no listed species are present in the action area. EA should be revised to state that in May 2006 federally listed T&E and BLM Sensitive species were surveyed at each of the proposed sites. "Sensitive" species include BLM and Colorado listed species of concern. Cooper's hawks were surveyed by broadcast surveys and nest	The only surveys conducted were for BLM Sensitive Plants, fish, and raptors (including special status raptors). Surveys for all T&E species were not conducted; no bat surveys were conducted; no herpetile surveys were conducted. Therefore the suggested revision to the EA stating that federally-listed T&E and sensitive species were surveyed in May 2006 would be incorrect. Information on surveys conducted is already included in the EA and will

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			searches. Plant surveys were also conducted with none found.	be restated in the Affected Environment of the T&E section.
137.	TE	CO01-27	With respect to the specific discussion of sensitive species, the EA should be revised to reflect better the logic underlying its conclusions. On page 40, the document states that roosting of fringed myotis is considered unlikely, without explaining why. This and other presence/absence conclusions for T&E species should be reviewed and clarified to demonstrate uniformly the basis upon which the determinations were made.	Text has been changed.
138.	TE	CO01-28	BLM notes northern goshawk nest north of Site 3. EA states if nest is determined active prior to Site 3 development, construction and operation activities would be precluded within 1/2-mile of nest between Feb. 1 and Aug. 15 or until young have fledged. This is consistent with the RMP. However, on page 45, the EA indicates that NSO would occur within 1/4-mile of the nest, if active b/w Feb. 1 and Aug. 15. This statement is somewhat misleading; the RMP preclusion of surface occupancy within 1/4-mile of active goshawk nests is applicable throughout the calendar year. Due to topography, operations are not anticipated within ½-mile of the nest site.	Clarification on NSO requirements has been added into the mitigation bullets of the Migratory Bird and T&E sections of the EA.
139.	TE	CO01-29	The project will result in minor depletions in Colorado River flows, estimated at less than 19-acre feet/yr. USFWS Colorado River Endangered Fish conservation strategy pursuant to which entities responsible for "minor depletions" of Colorado River water can offset potential impacts to those fish species through payment of a fee. Shell will commit to participating in this conservation program and to contribute a minor depletion fee, pursuant to the forthcoming Section 7 consultation between BLM and USFWS regarding the proposed action. This mitigation will result in impacts to listed fish being even less significant.	BLM and the USFWS have an existing agreement addressing consultation for the endangered Colorado River Fish. The USFWS issued a programmatic biological opinion to BLM in June 1994 for all small water depletions caused by BLM authorized activities in the Colorado River Basin. The USFWS has tiered the Biological Opinion issued for the RD&D projects to that programmatic biological opinion, thereby streamlining the work necessary to complete the consultation process. ESA Section 7 consultation with the USFWS was concluded in a formal letter of concurrence with the findings of the biological assessments for all five of the proposed RD&D projects sent to the BLM on September 12, 2006. The USFWS found that the estimated water requirements listed fall under the umbrella of the USFWS Biological Opinion (ES/GJ-6-CO-94-F0170) for small water depletions**.**
140.	TE	CO01-30	EA notes that a pedestrian survey was performed by WestWater Engineering in March 2006, and no such species were present at the site. The EA should note that Greystone 2006 survey previously cited likewise failed to identify any such sensitive plant species.	The following language was added to Affected Environment section of the T& E Plant Species section: “Greystone Environmental Consultants conducted biological investigations at the three test sites in May 2006 and likewise identified no sensitive plant species (Greystone 2006).”
141.	TE	OG02-08	More reliable information on depletions is required to evaluate the potential impacts on downstream critical habitat for the Colorado River endangered fish. The BLM must consult with the USFWS for purposes of Section 7 of the Endangered Species Act on all five RD&D leases receiving concurrent consideration as part of the BLM’s RD&D Leasing Program, rather than consulting on the leases separately as appears to have been done to date.	BLM and the USFWS have an existing agreement addressing consultation for the endangered Colorado River Fish. The USFWS issued a programmatic biological opinion to BLM in June 1994 for all small water depletions caused by BLM authorized activities in the Colorado River Basin. The USFWS has tiered the Biological Opinion issued for the RD&D projects to that programmatic biological opinion, thereby streamlining the work necessary to complete the consultation process. ESA Section 7 consultation with the USFWS was concluded in a formal letter of concurrence with the findings of the biological assessments for all five of the proposed RD&D projects sent to the BLM on September 12, 2006. The USFWS found that the estimated water requirements listed fall under the umbrella of the USFWS Biological Opinion (ES/GJ-6-CO-94-F0170) for small water depletions.
142.	UTIL	CO01-08	Requiring co-location of utility services in the combined ROW is not listed within the scope of any of Shell’s plans of operation, and in some cases would be a very impractical and unfeasible requirement. Request text change to require co-location of utility services in combined ROW *where feasible*.	Comment noted.
143.	VEG	ST02-23	The loss of 150 acres of pinyon-juniper woodlands would be a permanent, adverse effect (given a 300-year recovery period).	In context and intensity this adverse effect would not be considered significant.
144.	VEG	CO01-12	Pages 70-72 identify intermittent stream channels as Waters of the U.S. based on studies conducted by Wright Water Engineers. The EA should consider the 2006	Under direction of the Corps of Engineers, we are to follow current guidance for Waters of the U.S. Until new guidance is issued by the Corps, the intermittent stream channels are

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			Rapanos v. U.S. U.S. Supreme Court ruling in classification of these intermittent streams. Additionally, the proposed mitigation on page 72 should be revised to include the application for a Section 404 permit for activities in intermittent stream channels, if required. The Corps of Engineers is expected to issue guidance in the near term relating to the post-Rapanos definition of regulated waters of the U.S. Shell will comply with the terms of any applicable Clean Water Act permit relating to activities conducted in intermittent stream channels.	considered Waters of the U.S. On Page 72 of EA, language changed to read "Obtain a Section 404 permit from the Corps for activities that may require removal or modification of intermittent stream channels classified as Waters of the U.S."
145.	WILD-A	ST04-15 ST04-16 ST04-17 ST04-18 ST04-20 ST04-21 ST04-27	Because shallow groundwater stored in the Green River Formation recharges springs and surface water within the Piceance Basin, protection of groundwater sources and surface waters is critical to maintain springs and streams that support quality fisheries and diverse aquatic life. The maintenance of both the quality and quantity of surface water flow is not ensured by a monitoring program only, and the data presented in the EA does not contain sufficient detail to ensure these resources will be protected. The subsurface release of gases and drilling fluids in close proximity to fault lines may result in the escapement of noxious materials to ground and surface waters, ultimately entering into flowing waters throughout the Piceance Basin. These releases could cause the immediate degradation of water quality sufficient to cause acute or chronic mortality in fish and other aquatic organisms. Any mortality of aquatic organisms is grounds for immediate concern and should be reported to the CDOW immediately. A larger geographic area (for example possibly a 2-mile radius or more- up and down gradient) would likely be necessary to characterize baseline water quality. Mitigative factors should include work performance indicators that result in the continuance of stream water quality and quantity sufficient to maintain self-reproducing populations of the fish species found in impacted waters presently and into the future, without intermission.	The EA identifies a comprehensive water monitoring and response program as an integral component of the proposed process. This plan will be developed in cooperation with BLM, USGS, CDPHE, and industry. The monitoring and response plan will address monitor well locations, water-bearing units to be monitored, monitor well design, analytes, water level measurements, frequency of sampling and analysis, sampling techniques, analytical methods, QA/QC processes, and reporting requirements. The water monitoring and response plan will not be restricted to groundwater, but will address surface water upstream and downstream from the Shell sites, springs, seeps, and groundwater-surface water interactions.
146.	WILD-A	ST04-22	An emergency response plan should be written prior to development and implemented. High pressure ammonia is proposed for use in creating the freeze walls. Emergency procedures and protocol should be included in contractor and employee training. Accident mitigation should be practiced in mock situations to adequately prepare for an incident. Incidents should be reported to the CDOW as well as other local, State, and Federal personnel.	An approved emergency response plan will be developed by Shell.
147.	WILD-A	ST04-23	All Waters of the U.S., including those with no water but with an ordinary high water mark, are required to be permitted through the US Army Corps of Engineers (COE).	Comment noted and already addressed in EA. Page 87 Subalternative - Proposed Action with Mitigation - Sites 1, 2, and 3 states that "impacts to aquatic wildlife would be minimized by obtaining and complying with the COE Nationwide Permit 12 conditions."
148.	WILD-A	ST04-25	Water rights could be adversely impacted from oil shale development. Water management may be an issue for operations which require disposal and treatment of water.	The EA states that up to 250 to 300 gallons per minute (gpm), or up to 480 acre-feet per year of water would be required for resaturation of the shale oil recovery zone during the reclamation process. However, groundwater withdrawals for resaturation of the pyrolysis zone will require this volume of water for 12 to 18 months, and not for the entire life of the facility. Based upon the projected stream depletions associated with Shell's anticipated reclamation groundwater use, BLM has prepared a Biological Assessment for USFWS review. Process water needs during the life of the facility are substantially less, about 10 gpm or 16 acre-feet per year, than the water requirements during the reclamation phase. Shell currently owns a number of smaller water rights in the area, and has committed to purchasing the additional senior water rights required to provide water for the RD&D

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				projects.
149.	WILD-A	ST04-26	The reduction in the acid neutralizing capacity in Trapper's Lake, considered an important meta-population for Colorado River Cutthroat trout (and by inference, impacts to other mountain lakes in the Flattops Wilderness Area), is an important finding that should not be discounted. Careful baseline data should be collected and analyses conducted to ensure that increasing acidity due to the energy production itemized by the RFFD is abated/mitigated before these impacts are allowed to occur.	If applicable, this will be included in the comprehensive water monitoring and response program as an integral component of the proposed process. This plan will be developed in cooperation with BLM, USGS, CDPHE, and industry.
150.	WILD-A	ST04-28	Water for fracturing and other processes should be taken from locations where populations of fish and other aquatic life forms will not be impacted by reduced flows. Hoses and pump intakes should be screened to prevent the entrainment of larval fish. Drilling, process and other fluids can be acutely toxic to aquatic life and should be disposed of in a manner to not contaminate streams, springs, or ponds.	The Biological Assessment covers impacts from groundwater depletions. All surface water in the vicinity of the Shell tracts is intermittent in nature. No fish are present. No impacts are expected to aquatic organisms aside from potential water depletions downstream and as described in the EA.
151.	WILD-A	ST04-29	CDOW recommends project proponent participation in CDOW's Operation Game Thief program.	Comment noted.
152.	WILD-T	ST04-01 ST04-05	Each of the sites are located within mule deer, elk, or greater sage grouse range. Habitat impacts should be evaluated and mitigated for on a scale exceeding the area of each 160-acre site. Energy development should be managed such that no net loss to wildlife habitat occurs.	Text updated to reflect ranges of mule deer, elk, and sage grouse.
153.	WILD-T	ST04-02	Sagebrush communities should be preserved to the extent practicable.	Comment noted.
154.	WILD-T	ST04-03	RD&D sites could be attractive nuisance for some wildlife species resulting in indirect effects. Warm operations during winter could create a "snuggle up" effect for wildlife by moving them from more desirable habitat to less desirable habitat to take advantage of warmth created by operations.	Shell proposes to fence the entire 160 acres, since most of the area will contain some type of oil shale operation. Therefore, wildlife will not have an opportunity to "snuggle up" against any warm facilities.
155.	WILD-T	ST04-04	A proposed perimeter fence should be constructed which is wildlife-friendly (high tensile fencing).	Fencing will be wildlife-friendly.
156.	WILD-T	ST04-06	Four habitat conservation methods could be developed for the species of high importance for this EA: mule deer, greater sagegrouse, and elk. The methods include avoidance, onsite mitigation, offsite mitigation, or compensatory funding. Mitigation measures should be developed by project proponents and measured/monitored using performance based objectives; should be planned to balance habitat loss with habitat gain at ratio of 1:3.	Because the project is currently in the RD&D stage, it has been agreed upon by both CDOW and BLM to defer off-site mitigation for big game until the process used is deemed economically and environmentally feasible. At this time a comprehensive mitigation strategy would be developed by BLM and CDOW for commercial development of oil shale resources.
157.	WILD-T	ST04-07	Avoid suitable sage grouse habitat (sagebrush dominated or co-dominated vegetation, wet meadow, and riparian areas) within a 4-mile radius of active, inactive, and historical leks.	Because of poor forb and grass understory cover within the boundaries of the Shell tract, the tract provides limited utility for grouse. Reclamation of the site will most likely enhance habitat suitability for grouse.
158.	WILD-T	ST04-08 ST04-11	Reclamation should focus on returning disturbed areas to productive winter range as quickly as possible after disturbance.	BLM WRFO has a standard seed mix for reclamation which includes bluebunch wheatgrass. No non-native plant species are part of the seed mix. The August 15, 2006 EA on page 84 lists the standard seed mix under Proposed Action with Mitigation - Sites 1, 2, and 3.
159.	WILD-T	ST04-09	Aggressive, non-native grasses should not be used for reclamation seeding. These include crested wheatgrass, smooth brome, intermediate wheatgrass, and pubescent wheatgrass. Onsite mitigation should be completed in addition to reclamation and as quickly as possible because many species take years to reestablish. The parameters of onsite mitigation should be closely monitored by CDOW.	BLM WRFO has a standard seed mix for reclamation which includes bluebunch wheatgrass. No non-native plant species are part of the seed mix. The EA on page 84 lists the standard seed mix under Proposed Action with Mitigation - Sites 1, 2, and 3. Reclamation will occur after operations are complete. A reclamation plan will be developed with input from CDOW.
160.	WILD-T	ST04-10	At least 20% of all disturbed areas associated with this project should receive enhanced reclamation effort focused on rapid re-establishment of woody browse species	Reclamation will occur after operations are complete. A reclamation plan will be developed.

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			appropriate for mule deer winter range and other associated seasonal habitats, with particular focus on re-establishment of Wyoming big sagebrush and antelope bitterbrush stands in these areas.	
161.	WILD-T	CO01-18	The EA makes an incorrect statement about the MBTA and overstates the applicability of the Act. It does not prohibit mere "Disturbance" of protected birds, nor do habitat impacts give rise to "take" under the MBTA.	Page 29 of the August 15, 2006 EA provides a generalized summary of the MBTA in relation to projects that remove nesting habitat or include human-related activities that may cause disturbance and worst-case scenario, nest abandonment. The MBTA protects bird populations not bird habitats. However, impacts to habitat - such as removal of habitat or activities that disturb nesting migratory birds could result in "take" of a species through destruction of eggs or nest during habitat removal or nest abandonment from disturbance. Birds described as native species in the Wildlife section are included in the list of birds specifically identified by the MBTA as protected under the Act.
162.	WILD-T	CO01-19	The EA overstates the certainty of protected birds utilizing the proposed reserve pits. The EA should indicate that migratory birds may be attracted to open water pits, would incur impacts from use.	Language on page 31 was modified to read “cuttings management pit”, rather than reserve pits. However, BLM uses the word “reserve pits" to describe any type of pit that may have liquid in it. “Reserve pits” continues to be terminology used in the Shell EA and the other RD& EAs.
163.	WILD-T	CO01-20	On pages 31-33, EA concludes displacement of migratory birds resulting from habitat clearance and other site activities. Commenter does not believe that avian habitat is a limiting factor in the Project area.	There will be some impact to migratory birds, even if the area is not considered high value habitat.
164.	WILD-T	CO01-22	On Page 33 and 99, EA states no surface occupancy (NSO) will be allowed within 1/2 mile of SSS or raptors between Feb. 1 and Aug. 15; and development or construction-related activities will be prohibited within 1/4-mile of nests between Feb. 1 and Aug. 15. This misstates the applicable surface occupancy restrictions established in the White River RMP.	The NSO criteria are described in the mitigation sections of the Migratory Bird and T&E sections of the EA. CDOW has set standards for buffer zones around active raptor nests due to their sensitivity to disturbance, including those that are not special status. This includes red-tailed hawks. Seasonal mitigation measures apply to all raptors and migratory birds.
165.	WILD-T	CO01-23	Commenter believes that through proper mitigation and consultation, species of concern can be protected while allowing the project to move forward.	The mitigation for avian species provided in the EA is not intended to shut down the project, nor preclude its full development. Mitigation is intended to protect species that without some minimum protection, would be at risk from loss of habitat or nesting opportunities. The guidance on NSO is to allow young of the year to successfully fledge and allows construction to occur either prior to nesting (before Feb. 1) or to begin after young have fledged (Aug. 15).
166.	WILD-T	CO01-31	The August 15, 2006 EA states, "Site 2 is year-round range and severe winter range for mule deer (NDIS 2006)." According to NDIS, this is incorrect. EA should be revised.	Text modified on page 94; severe winter range taken out.
167.	WILD-T	OG02-21	Open reserve pits for waste can be potentially toxic to birds and animal species.	BLM and Shell are committed to identifying proper technologies to keep wildlife separated from open liquids.
168.	WILD-T	IN16-19	Page 4-21, the “process water” ponds may require shielding from waterfowl use.	Exclusion methods are included in the mitigation described in the EA.
169.	WILD-T	IN16-32	Page 5-4 — Ponds may require “bird-proofing” for waterfowl.	Exclusion methods include netting, bird-balls, or other methods as described in mitigation described in the EA.
170.	WQ	IN02-01	The statement “Reclamation would include flushing and cooling of the shale inside the freeze wall” should be put into perspective. Former in-situ retorts took 10 plus years to flush and cool. The EA should take note of the extreme difficulty of cleaning in-situ retorted shale. Cleaning up the groundwater to meet State or EPA discharge criteria will be very difficult and time consuming.	Water quality will be closely monitored through a comprehensive monitoring, compliance, and response plan. Additional permitting requirements will alleviate the possibility of water quality impacts associated with the RD&D projects.
171.	WQ	OG02-24	BLM failed to evaluate the cumulative impacts of the five RD&D proposals on groundwater resources.	The cumulative impacts analysis was comprehensive and appropriate given available information and reasonably foreseeable activities. The actions proposed in the three EAs

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				for oil shale RD&D, as well as cumulative impacts to the Resource Area, are tiered to the White River RMP/EIS and are within the scope and analysis of that document.
172.	WQ	FD03-04	What affects of heating the formation will have on microorganisms?	Types of microorganisms and potential affects are unknown at this time.
173.	WQ	FD03-05 FD03-07 FD03-08 FD03-09 FD03-14 ST02-10	What will be done to ensure that ammonia will not be released into water or air? What will happen to nitrogen buried in oxygenated unsaturated zone? Monitoring parameters should include GC/MS scans. What will the duration, flexibility, and frequency of surface water monitoring be? What chemical constituents will be monitored in groundwater? Will leakage from evaporation pond be monitored? Consideration should be given to reinitiating data collection at discontinued stream sites formerly used by USGS. The transition from fecal coliform to E. coli standards will be completed in 2008; fecal coliform standards will be replaced by E. coli standards. Plan of operations is missing total recoverable arsenic.	A detailed water monitoring and response program will be developed in cooperation with BLM, USGS, CDPHE, and industry. The monitoring and response plan will address monitor well locations, water-bearing units to be monitored, monitor well design, analytes, water level measurements, frequency of sampling and analysis, sampling techniques, analytical methods, QA/QC processes, and reporting requirements. The water monitoring and response plan will not be restricted to groundwater, but will address surface water upstream and downstream from the Shell sites, springs, seeps, and groundwater/surface water interactions.
174.	WQ	FD03-06	What will happen to nitrogen buried in oxygenated unsaturated zone?	If the nitrogen is oxidized to form nitrate in the unsaturated zone, is leached downwards, enters groundwater, and migrates downgradient from the pyrolysis zone, it would be detected in groundwater monitoring wells. If the nitrate concentration exceeds ARAR standards, appropriate remediation strategies would be employed as necessary.
175.	WQ	FD03-11	Will leakage from evaporation ponds be monitored?	Potential leakage from the evaporation pond will be monitored using groundwater monitoring wells located hydraulically downgradient of the facility.
176.	WQ	FD03-12	Flushing the combustion zone with water to remove residual contamination: it is possible contamination will continue.	Groundwater monitoring will continue after the flushing is completed and the freeze wall is allowed to thaw to monitor groundwater quality flowing from the pyrolysis zone.
177.	WQ	FD03-13	Will the buried cuttings be monitored?	Drill cuttings that are buried and covered on-site will be monitored relative to impacts to underlying groundwater, with groundwater monitoring wells located hydraulically downgradient of buried cuttings and ponds.
178.	WQ	ST02-03	The transition from fecal coliform to E. coli standards will be completed in 2008; fecal coliform standards will be replaced by E. coli standards.	Text was modified in the EA (p. 57) to reflect the June 2008 transition. Shell will comply with all regulations and will modify the surface water and groundwater monitoring analytes to comply with changes to the regulations as they occur.
179.	WQ	ST02-04	Include a discussion of the head difference observed at cluster #4-1.	Text was modified in the EA (p. 58) to include, The potentiometric head difference between the L4 and L5 intervals at this location measured in the summer of 2005 was approximately 65 feet.
180.	WQ	ST02-05	Leakage from impoundments and evaporation ponds would be considered a potential discharge to groundwater and would need to be protective of groundwater standards.	This issue was addressed on page 68 of the August 15, 2006 EA.
181.	WQ	ST02-06	The maximum allowable TDS concentration is 1.25 times the background concentrations for cases where the pre-activity TDS background is between 501 and 10,000 mg/l.	The groundwater TDS standard is spelled out clearly in the revised text on page 66 as per the comment recommendation. Additionally, Shell will comply with applicable groundwater standards, and maintain water quality to be protective of the uses the groundwater quality standards are intended to protect.
182.	WQ	ST02-07	All monitoring wells need to be abandoned such that they meet minimum standards established by the Division of Water Resources.	Shell will comply with well abandonment standards established by the Division of Water Resources.
183.	WQ	ST02-08	Correct punctuation on page 67.	Done in text.
184.	WQ	ST03-01	The proposed operation may impact existing water rights. A plan for augmentation may be required to replace all water depletions.	Text was modified on EA page 121 to address this comment. Shell currently owns a number of smaller senior water rights in the area, and is in the process of obtaining additional senior water rights for the anticipated needs at the RD&D sites.

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185.	WQ	ST03-02	Stormwater runoff must be released to the stream system within 72 hours. This may require a discharge permit or replacements for evaporation.	Text was modified on EA page 121 to address this comment. Shell will design the stormwater management system to comply with Division of Water Resources regulations.
186.	WQ	ST03-03	Jurisdictional size dams must be approved by the State Engineer prior to construction. For non-jurisdictional size dams, a Notice of Intent must be filed 10 days prior to construction.	Text was modified on EA page 121 to address this comment. Shell will comply with Division of Water Resources regulations regarding construction of jurisdictional and non-jurisdictional sized dams required at the sites.
187.	WQ	ST03-04	All water wells must comply with CRS 37-90-137 and 37-92-602. Well construction must comply with Water Well Construction Rules.	Text was modified on page 66 to add specific rule citations. Water wells constructed at Shell RD&D sites will be permitted, constructed, and abandoned in accordance with Division of Water Resources well construction rules.
188.	WQ	CO01-09	Text on page 64 should be revised to reflect that the planned reinjection process will not degrade the existing ground water quality.	The text was modified to address this comment. Shell will reinject groundwater into aquifer intervals with lower water quality (higher TDS) than the native water quality for the injection interval.
189.	WQ	CO01-11	The EA states that the BLM and the three RD&D lease companies would develop a Plugging and Abandonment Plan. The EA should be revised to include consultation with the State Engineer in addition to the Colorado Division of Reclamation Mining and Safety in connection with the development of such a plan.	The text was modified to address this comment. The plugging and abandonment plan to be used at all RD&D sites will comply with the State Engineers office requirements.
190.	WQ	ST05-01	The Oil Shale RD&D tracts project located in the White River Basin could have an adverse impact on the salinity of water in the Colorado River. Requests that EA include a discussion regarding the impacts on salinity in the Colorado River from the proposed project.	The projects potential impact on salinity in the Colorado River would be related to increases in TDS for groundwater that naturally discharges into Yellow Creek or the White River downgradient of the project site. The operator will be required to monitor groundwater quality and meet applicable standards for TDS, as specified in the Basic Standards for Groundwater, 5 CCR 1002-41 Regulation No. 41. CDPHE and WQCD regulate TDS in groundwater and state the following: Total dissolved solids concentrations of less than 500 mg/l are not expected to impair any groundwater use. The 25% allowable incremental increase for waters with a background between 500 and 10,000 mg/l would afford a greater degree of protection to groundwater with lower TDS concentrations. Groundwater with TDS concentrations greater than 10,000 mg/l would not have a numeric limit. Additional text was included to describe the Colorado Basin Salinity Control Forum.
191.	WQ	OG02-07	The estimates of consumptive use of water in the Shell EA appear to be unrealistically low.	The EA states that up to 250 to 300 gallons per minute (gpm), or up to 480 acre-feet per year of water would be required for resaturation of the shale oil recovery zone during the reclamation process. However, groundwater withdrawals for resaturation of the pyrolysis zone will require this volume of water for 12 to 18 months, and not for the entire life of the facility. Based upon the projected stream depletions associated with Shell's anticipated reclamation groundwater use, BLM has prepared a biological assessment for USFWS review. Process water needs during the life of the facility are substantially less, about 10 gpm, or 16 acre-feet per year, than the water requirements during the reclamation phase. Shell currently owns a number of smaller water rights in the area, and has committed to purchasing the additional senior water rights required to provide water for the RD&D projects.
192.	WQ	OG02-53	There is no body of knowledge and technology that will allow the reliable design of effective waste treatment and disposal processes.	Shell has committed to construction of a freeze wall around the entire perimeter of the pyrolysis zone. The purpose of the freeze wall is to contain all of the shale oil and shale oil by-products within the production zone, and to minimize or eliminate the movement of groundwater from outside the facility into the pyrolysis zone. The freeze wall will not be thawed until the pyrolysis zone has been resaturated and the groundwater within this zone meets Colorado Basic Groundwater Standards for constituents of concern. Shell has committed to implementing a pump and treat system within the pyrolysis zone following

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				resaturation and cooling; to flush, recirculate, and treat groundwater within the cooled production zone to remove contaminants. Pump and treat is a proven remediation technology for containment of impacted groundwater, which may be effective in this situation. However, Shell may need to implement other remediation technologies if flushing with groundwater is not effective at the site. Shell is already testing other remediation strategies to treat residual contamination that may be created by the pyrolysis process.
193.	WQ	OG02-54	Shell proposes to limit monitoring to a time frame based on the travel times from the retorting cell to the monitoring wells. Monitoring should be continued indefinitely at a number of distances from the production cell, though the temporal intensity of the monitoring could be reduced over time.	Shell will monitor groundwater quality at each RD&D site for a time period sufficient to determine that groundwater migrating beyond the site boundary is in compliance with applicable groundwater quality standards and is protective of the uses that the groundwater quality standards are intended to protect. Shell has already completed a number of testholes at one of the RD&D sites to evaluate site specific hydrogeologic conditions relative to the occurrence of oil shale resource intervals. Current plans will leave the uppermost oil shale zone in place during development of deeper intervals to protect groundwater in the overlying Uinta Formation. Shell plans to leave a zone of un-reacted oil shale in place surrounding the production zone to provide further hydraulic isolation.
194.	WQ	OG02-55	Shell proposes to rinse the production cell with a pump and treat system (and possibly bioremediation) until the amount of hydrocarbons in the heated shale is reduced to “acceptable levels.” The EA should include some conceptual definition of what this stopping level would be based upon the applicable regulatory requirements.	Groundwater will be restored to a quality that conforms to applicable groundwater quality standards and that is protective of the uses that the groundwater quality standards are intended to protect.
195.	WQ	OG02-57 IN16-01	The injection wells and freezing and associated fracturing of the shale formation could create pathways for the migration of contaminated water into adjacent aquifers and surface water. The aquifer confining layers that separate the Upper and Lower aquifer will be greatly disrupted, allowing flow between the aquifers. This is normally not allowed under Colorado state regulations. Residual effects on ground water in the “retorted zone” will be difficult to remediate.	Shell has stated in their Plan of Operations that they will contain the groundwater reinjected into the production zone within the freeze wall area, and will flush and treat the groundwater within the pyrolysis zone using a pump and treat system. This treatment system is considered an in-situ system, which is the suggested approach in the WRA comments on page 21. Shell is also currently evaluating other remediation alternatives to treat impacted groundwater within the former pyrolysis zone. Current plans will leave the uppermost oil shale zone in place during development of deeper intervals to protect groundwater in the overlying Uinta Formation. Shell plans to leave a zone of un-reacted oil shale in place surrounding the production zone to provide further hydraulic isolation.
196.	WQ	IN16-01	Long-term surface subsidence is likely to be much more than is anticipated. There is a distinct risk that subsidence could occur during the operations phase.	Shell has completed smaller scale shale oil development tests in the area, and their engineers have evaluated geotechnical conditions that affect subsidence. Shell has not observed significant subsidence during these smaller scale tests.
197.	WQ	IN16-04	The lease terms must include adequate requirements for monitoring, otherwise impacts cannot be identified or quantified, nor can sound remediation/prevention measures be planned/designed, and the effectiveness of such plans/designs cannot be evaluated. All actions that may result in unwanted effects must be included in the monitoring program.	Standard Lease Terms have been developed to provide the lessee the right to use the leased land as needed to explore, drill, mine, extract, remove, beneficiate, process, and dispose of the oil shale and products of oil shale located under the leased lands. Standard Lease Terms provide for reasonable measures to minimize adverse impacts to surface and subsurface resources. These include, but are not limited to, modifications to the siting or design of facilities, schedule of operations, and specifications of interim and final reclamation measures. Federal environmental protection laws such as the Clean Water Act, Clean Air Act, Endangered Species Act, and National Historic Preservation Act, will be applied to all lands and operations and are also included in the standard lease terms.
198.	WQ	IN16-06	Page 59, the potentiometric data across the Mahogany zone show small head changes in part because this area is in the recharge-to-discharge transition, where shallow and	The potentiometric elevation data provided by Shell in the EA is from newly installed test holes and monitoring wells, and is therefore based on less than one year’s data. Definition

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			deep aquifer water levels are about equal. There is compelling evidence to support the widely recognized “two-aquifer” system. The R-5 is a confining unit, within the overall “Lower” aquifer. Water quality differences are significant between the two major aquifers.	of significant confining units at each site will be based upon differences in potentiometric elevations and water quality constituents observed in monitoring wells completed in discrete water-bearing intervals.
199.	WQ	IN16-07	Page 59, where are the data from the zones noted?	The water level data was obtained from newly installed test holes and monitoring wells, and is considered preliminary by Shell as of the August 15, 2006 EA. The data will be published by Shell in their mining permit application to the Division of Mines and Geology.
200.	WQ	IN16-11	Page 64, The extremely steep gradient caused by dewatering will cause inflow to the heated zone via fractures.	Although some inflow to the heated zone is anticipated during dewatering of the zone prior to heating, the perimeter freeze wall is designed to provide hydraulic containment in the horizontal direction. Hydraulic containment in the vertical direction will be provided by leaving oil shale horizons in place both above and below the dewatered zone at each of Shell’s RD&D sites. Some minimal inflow of groundwater to the heated zone is likely.
201.	WQ	IN16-13	[Comments on Shell’s Plans of Operations:] The Upper and Lower aquifers are widely recognized. Their water quality differences are significant.	Delineation of hydrostratigraphic zones will be completed at each RD&D site. Hydraulic separation and water quality differences between zones will be documented and monitored.
202.	WQ	IN16-15	[Comments on Shell’s Plans of Operations:] Some leakage of groundwater into the retort is likely.	The base of the pyrolysis zone will vary at each site based on the nature of the resource (oil shale) and hydrogeologic and economic factors. The thickness of the seal below the pyrolysis zone will therefore vary at each site. The underlying hydrostratigraphic zone will be monitored during dewatering.
203.	WQ	IN16-16	[Comments on Shell’s Plans of Operations:] Several long-term monitoring wells will be needed, probably for decades.	Monitoring wells will be maintained at the site until site reclamation and site closure is complete.
204.	WQ	IN16-18	[Comments on Shell’s Plans of Operations:] The 1,500± feet of head difference, with any fracturing, could cause considerable inflow of water. These risks could be evaluated early in the project by selectively pumping the R-4 with a piezometer in the R-3.	Shell is currently performing aquifer tests at Site 1 to evaluate hydraulic properties of the hydrostratigraphic zones.
205.	WQ	IN16-21	[Comments on Shell’s Plans of Operations:] In Table 4.4, the first five parameters should be monitored continuously at each site. Was Fluoride inadvertently omitted? It is locally present in groundwater in high concentration.	The monitoring frequency for each parameter will be specified in the monitoring plan. Continuous monitoring of select parameters may be performed. BLM will require operators to test water quality samples for a list of analytes that will include fluoride, at least initially, to determine which constituents are present in each hydrostratigraphic interval.
206.	WQ	IN16-23	[Comments on Shell’s Plans of Operations:] There is great uncertainty in the long-term effectiveness of leaching. Long-term monitoring will be necessary. “Native” groundwater re-entry after freeze wall thaw will be to a greatly changed aquifer system. Monitoring must define these changes.	Groundwater monitoring and establishment of baseline conditions prior to heating of the oil shale are required components of the RD&D lease program. Groundwater monitoring following resaturation of the pyrolysis zone is also required. Groundwater will be restored to a quality that conforms to applicable groundwater quality standards and that is protective of the uses that the groundwater quality standards are intended to protect.
207.	WQ	IN16-24	[Comments on Shell’s Plans of Operations:] After solution mining, some Nahcolite will remain as rock-enclosed nodules.	Comment noted.
208.	WQ	IN16-25	[Comments on Shell’s Plans of Operations:] Commenter assumes that few residual “heavy-ends” will be left unrecovered. Nahcolite removal will result in more likelihood of subsidence. How far above the retorted zone will roof collapse extend before “bulking full?”	BLM understands that a portion of the “heavy-ends” will not be recovered. The depth of the nahcolite zone below the ground surface is believed to be sufficient to cause minimal subsidence at the ground surface.
209.	WQ	IN16-26	[Comments on Shell’s Plans of Operations:] Water inflow via fractures can occur from below. During dewatering a piezometer below the product zone could detect this.	Piezometers will be located in each hydrostratigraphic zone during production operations.
210.	WQ	IN16-27	[Comments on Shell’s Plans of Operations:] RE: Dawsonite – Research indicates leaching recovery of retorted shale is reasonably straight forward. Further research on this is needed.	The degree to which dawsonite can or will be leached following pyrolysis of the production zone will be evaluated as part of this project.

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211.	WQ	IN16-28	[Comments on Shell's Plans of Operations:] The "two-aquifer" terminology is strongly supported by geology, head, and especially water quality. Small head differences occur at a "cross-over" zone, where bore holes have been left unsealed, and near fault zones.	Shell will evaluate head distribution and water quality parameters in the various hydrostratigraphic intervals prior to development of the site.
212.	WQ	IN16-30	[Comments on Shell's Plans of Operations:] Discharge, PH, EC, and T should be monitored continuously. Fluoride occurs in high concentrations locally, and should be on this list. Organics used and produced on site should be on this list.	The monitoring frequency for each parameter will be specified in the monitoring plan. Continuous monitoring of select parameters may be performed. BLM will require operators to test water quality samples for a list of analytes that will include fluoride, at least initially, to determine which constituents are present in each hydrostratigraphic interval.
213.	WQ	IN16-34	[Comments on Shell's Plans of Operations:] In Tables 6.1 and 6.2 – What are the units that are designated by number? CFS?	The units in Table 6.1 for streamflows are given in cubic feet per second (cfs). In Table 6.2, the units for spring flows are given in gallons per minute (gpm).
214.	WQ	IN16-39	[Comments on Shell's Plans of Operations:] BLM must be certain that wells to be plugged are not needed for long-term monitoring, which will be a necessity. Decades of post-operations monitoring probably will be necessary.	Monitoring wells will be required until site reclamation and site closure are completed.
215.	WQ	IN16-40	[Comments on Shell's Plans of Operations:] Is the "target" zone the entire thickness of shale?	The target zone for resource recovery at each RD&D site will be evaluated by Shell on a site-by-site basis. It is not known to encompass the "entire thickness of shale" at any of the RD&D sites. Shell is currently performing aquifer tests at Site 1 to evaluate hydraulic properties of the hydrostratigraphic zones. Similar tests will be conducted at each site to establish hydraulic properties and hydraulic connections between each hydrostratigraphic zone.
216.	WQ	IN16-46	[Comments on Shell's Plans of Operations:] Multiple piezometers, properly isolated, in a single well, worked well at former oil shale tract C-b. Sufficient monitoring wells are needed outside of the retort "cell" to define the pre-project flow system. This definition can be complicated by the anisotropy of permeability related to fracture systems in the aquifers.	The number of monitoring wells required at each site will be sufficient to address the potential for fracture flow. The parameter list for surface water and groundwater will include a wide range of inorganic and organic constituents considered "baseline" in the region, and will include constituents for materials used on site that could be mobilized and released to the environment.
217.	WQ	IN16-47	[Comments on Shell's Plans of Operations:] Commenter is concerned that plugging of "all borings" does not preclude the necessary long-term monitoring wells.	Not all borings at the site will be abandoned at one time, and monitoring wells for relevant monitorable zones will be left in place until site reclamation and closure is complete.